4.4 Preliminary Design Drawings

4.4.1 Overall Conceptual Drawing

1) End of 2014－Beginning of 2017（Phase-1）

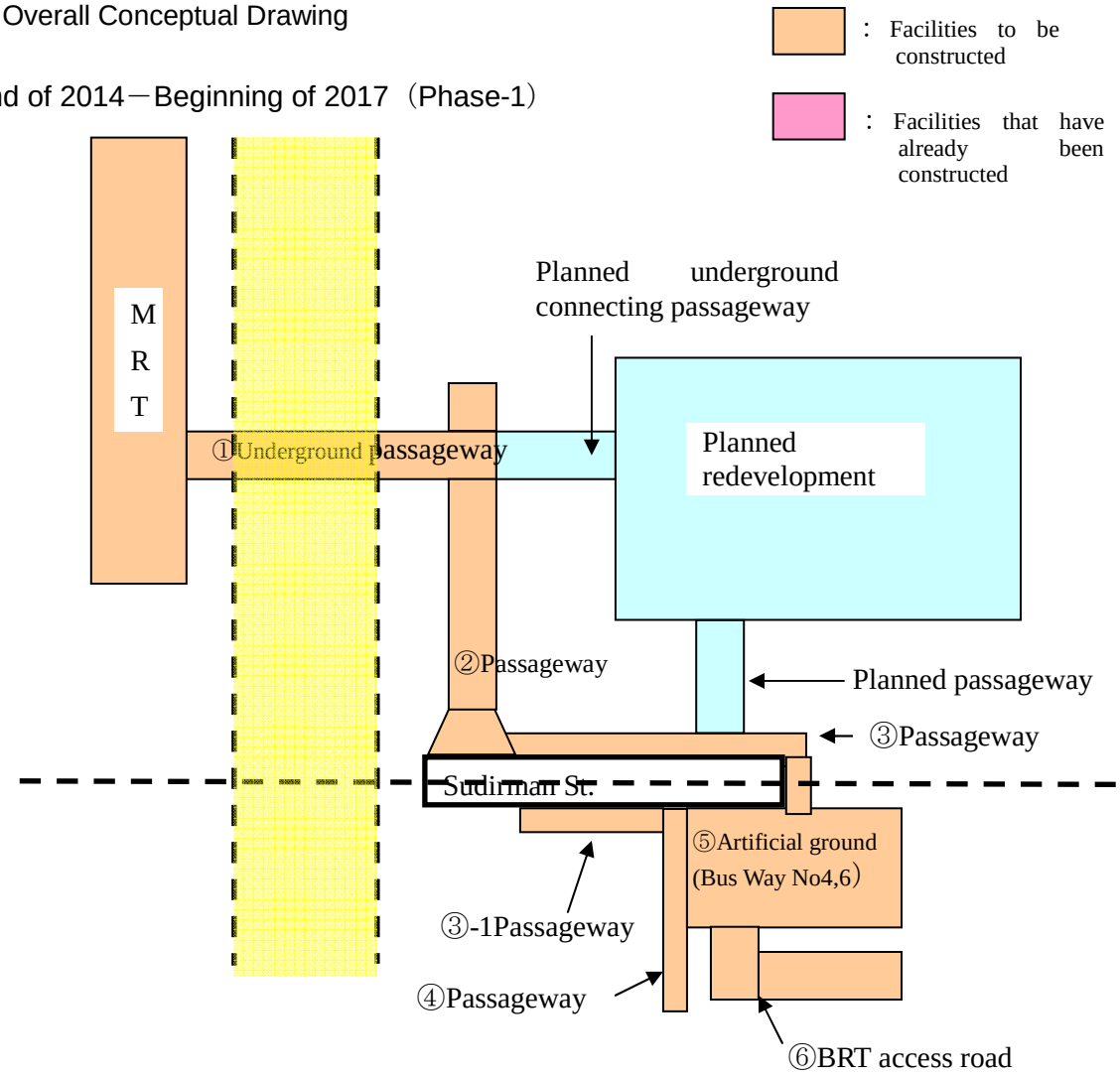


Figure-4.4.1 Overall Conceptual Diagram End of 2014 – Beginning of 2017

・At present, the MRT is scheduled for completion at the beginning of 2017.

・The Serpong-Bekasi Line and Airport Line railway, line and station are currently being studied.

・6 Toll Road are under construction.

1) ① – ⑥Upper drawings, passageway, artificial ground and BRT access road will be constructed.

①Underground Passageway：Width=10m, Length=60m

②Passageway：Width=6m, Length=101m

③Passageway：Width=4m, Length=92m

④Passageway：Width=4m, Length=50m

⑤Artificial ground：Width=55m, Length=72m

⑥BRT Access Road：Width=9m, Length=137m

2) Beginning of 2017－End of 2019 (Phase-2)

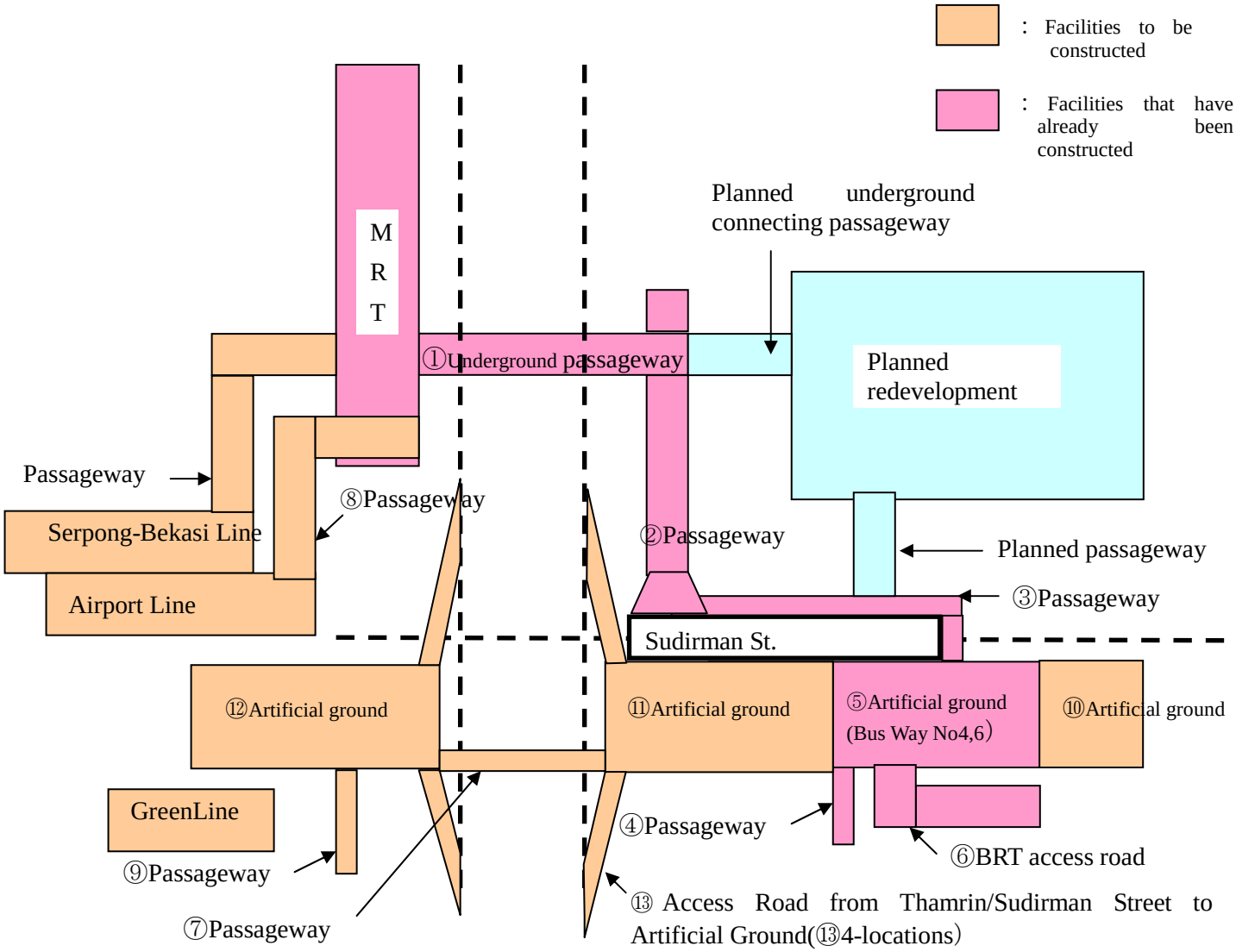


Figure-4.4.2 Overall Conceptual Diagram Beginning of 2017 – End of 2019 Source：Study Team

・The Serpong-Bekasi Line and Airport Line railway, line and station are under construction.
・Underground Passageway between Serpong-Bekasi Line Stn. and MRT Stn. are under construction.
・Monorail Station (Green Line) are under construction
・6 Toll Road have been completed on 2018.

1)①－⑥MRT Station have been completed, and passageway, artificial ground and BRT access road have been completed.
2)⑦Passageway between East and West Artificial Ground：under construction
3)⑧Passageway between airport line St. and MRT St: under construction
4)⑩－⑫Artificial ground: under construction
5)⑬Access Road from Thamrin/Sudirman Street to Artificial Ground(4-locations）: under construction

⑦Passageway：Width=4m, Length=133m
⑧Passageway：Width=4m, Length=53m
⑨Passageway：Width=4m, Length=23m
⑩Artificial ground：Width=55m, Length=30m
⑪Artificial ground：Width=55m, Length=42m
⑫Artificial ground：Width=50m, Length=150m
⑬Artificial ground Access road：Width=7m
Length=140m+120m+50m+85m

3) 2020－2030

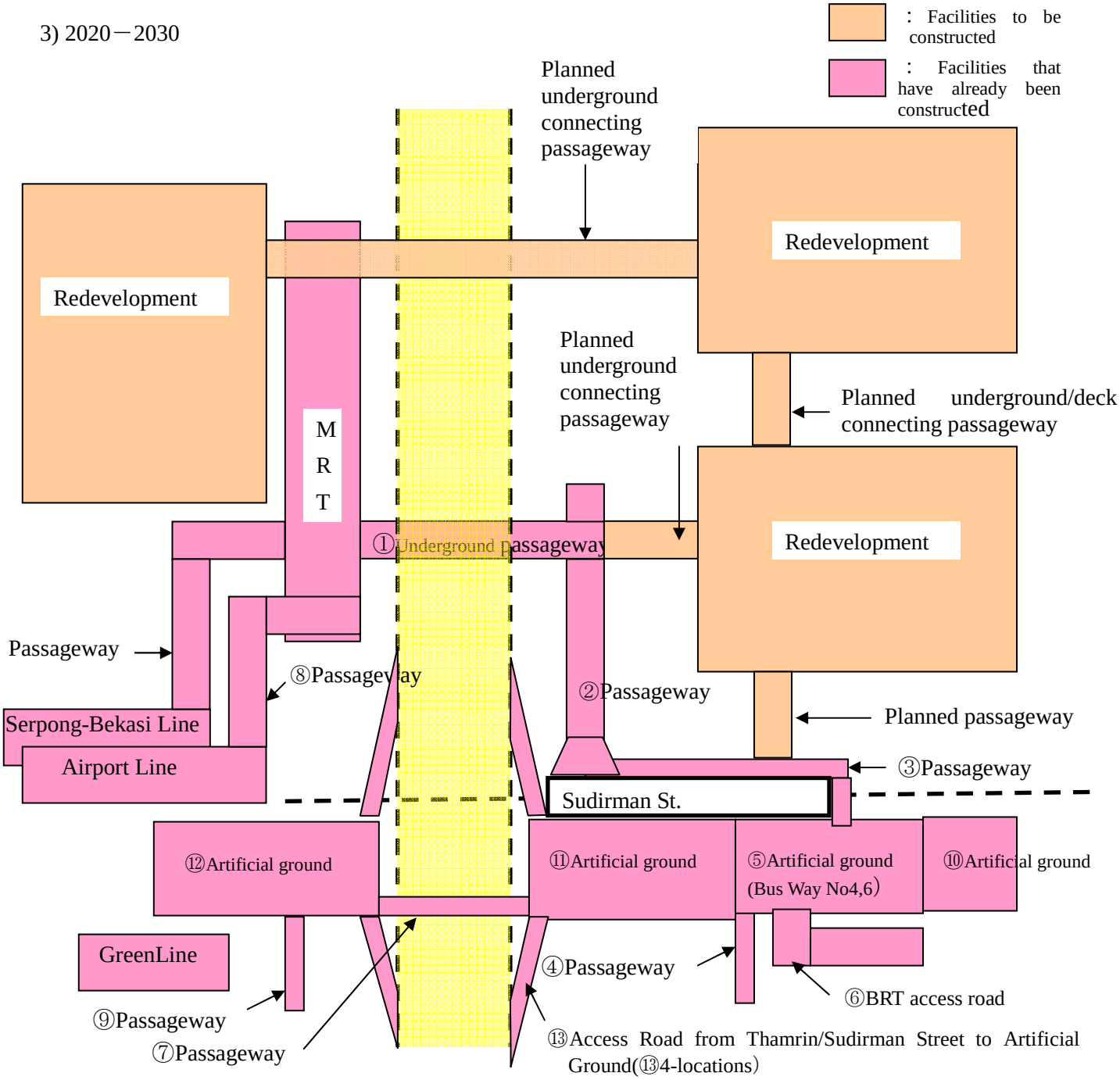


Figure-4.4.3 Overall Conceptual Diagram 2020-2030

Source：Study Team

- Serpong-Bekasi Line and Airport Line Stations have been completed.
- Underground Passageway between Serpong-Bekasi Line Stn. and MRT Stn. have been completed.
- Monorail Station (Green Line) have been completed.

1) ⑦Passageway between East and West Artificial Ground have been completed.
⑧Passageway between Airport Line Stn. and MRT Stn. have been completed.
⑩－⑫Artificial Grounds have been completed.
⑬Access Road from Thamrin/Sudirman Street to Artificial Grounds have been completed. (4-Locations)

2) Redevelopment Area and Underground Connecting Passageway, Connecting Deck construction.

4.4.2 Design Drawings for Passageway and Artificial Ground Facilities

The following drawings show the design of the facilities in accordance with the preliminary facility planning.

1) Phase-1 Design Drawings

Figure-4.4.4 Overall Plan View
4.4.5 Plan View of Underground Passageway on Thamrin Street and East side of Thamrin Street
4.4.6 Cross-section View of Underground Passageway on Thamrin Street and East side of Thamrin Street
4.4.7 Plan View of Passageway between Sudirman Station and Artificial Ground, around Sudirman Station
4.4.8 Cross-section View of Passageway between Sudirman Station and Artificial Ground, around Sudirman Station (1)
4.4.9 Cross-section View of Passageway between Sudirman Station and Artificial Ground, around Sudirman Station (2)
4.4.10 Plan View of Passageway between Artificial Ground and South/East Block
4.4.11 Cross-section View of Passageway between Artificial Ground and South/East Block
4.4.12 Plan View of Artificial Ground
4.4.13 Plan View of Artificial Ground (Phase-1)
4.4.14 Cross-section View of Artificial Ground (Phase-1)
4.4.15 Plan View of BRT Access Road
4.4.16 Cross-section View of BRT Access Road (1)
4.4.17 Cross-section View of BRT Access Road (2)
4.4.18 Plan View of Temporary Pier
4.4.19 Cross-section View of Temporary Pier (1)
4.4.20 Cross-section View of Temporary Pier (2)
4.4.21 Construction Plan Drawing of Underground Passageway on Thamrin Street

2) Phase-2 Design Drawings

Figure-4.4.22 Plan and Cross-section View of Passageway between East and West Artificial Ground (1)
4.4.23 Plan and Cross-section View of Passageway between East and West Artificial Ground (2)
4.4.24 Plan View of Passageway between Airport Line Station and MRT Station
4.4.25 Cross-section View Passageway between Airport Line Station and MRT Station
4.4.26 Plan View of Passageway stairs between Airport Line Station and MRT Station
4.4.27 Cross-section View of Passageway stairs between Airport Line Station and MRT Station (1)
4.4.28 Cross-section View of Passageway stairs between Airport Line Station and MRT Station (2)
4.4.29 Plan View of Passageway between Artificial Ground and South/West Block
4.4.30 Plan View of Artificial Ground (Phase-2)
4.4.31 Cross-section View of Artificial Ground (Phase-2)

3) Design Drawings for Station Facilities

Figure-4.4.32 Plan Drawing of Serpong Line Station
4.4.33 Plan Drawing of Airport Line Station

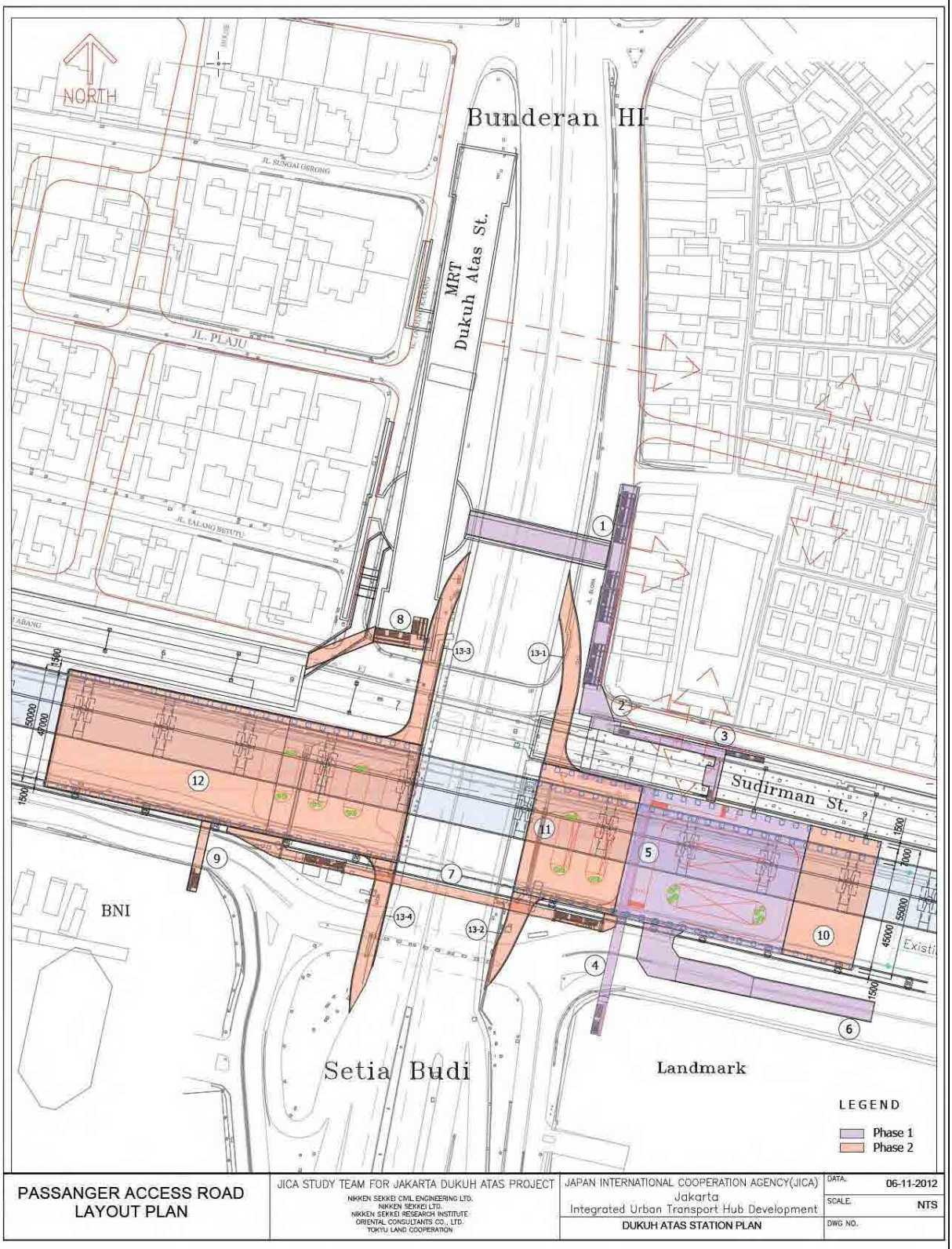


Fig-4.4.4 Overall Plan View

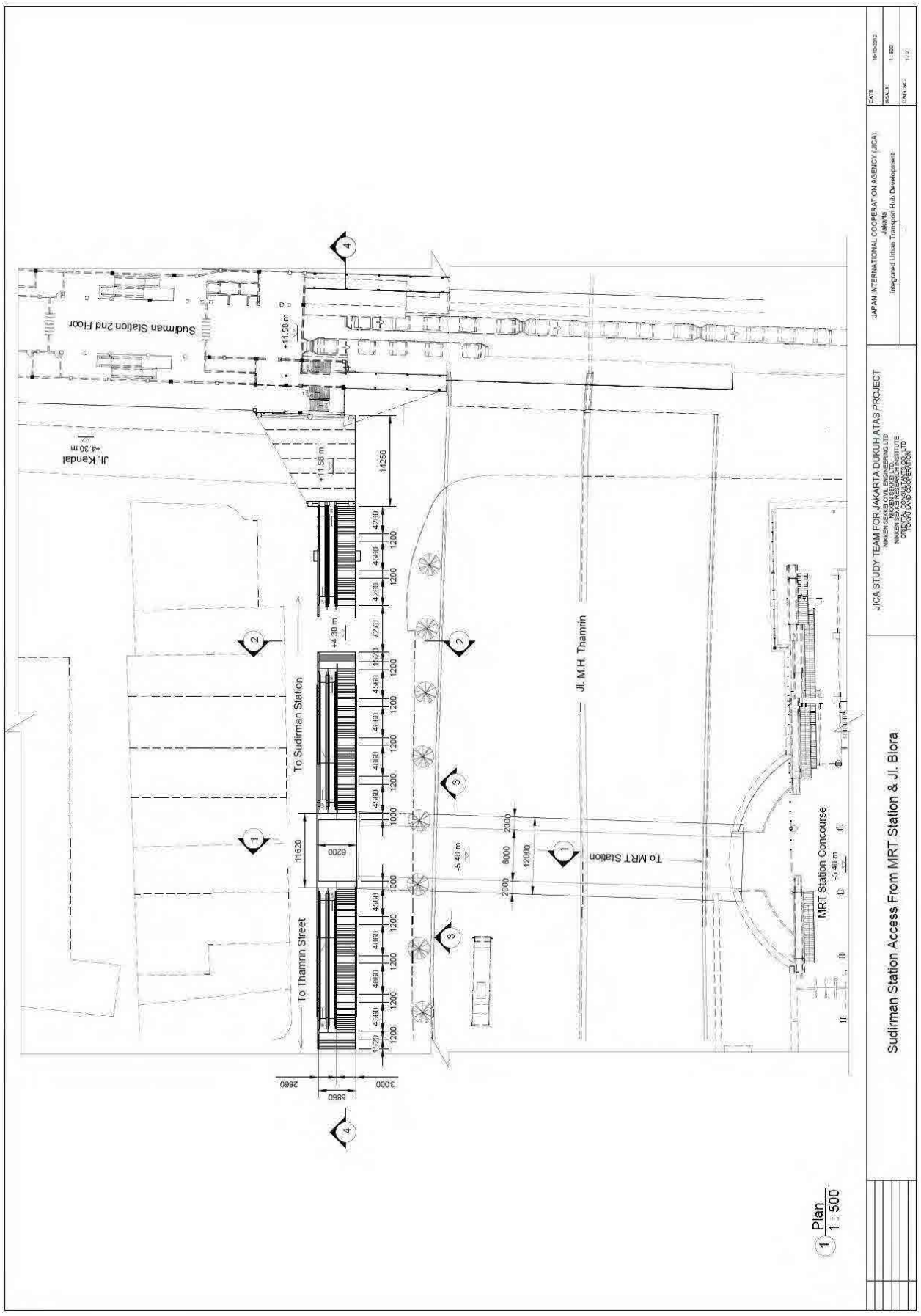


Fig-4.4.5 Plan View of Underground Passageway on Thamrin Street and East side of Thamrin Street

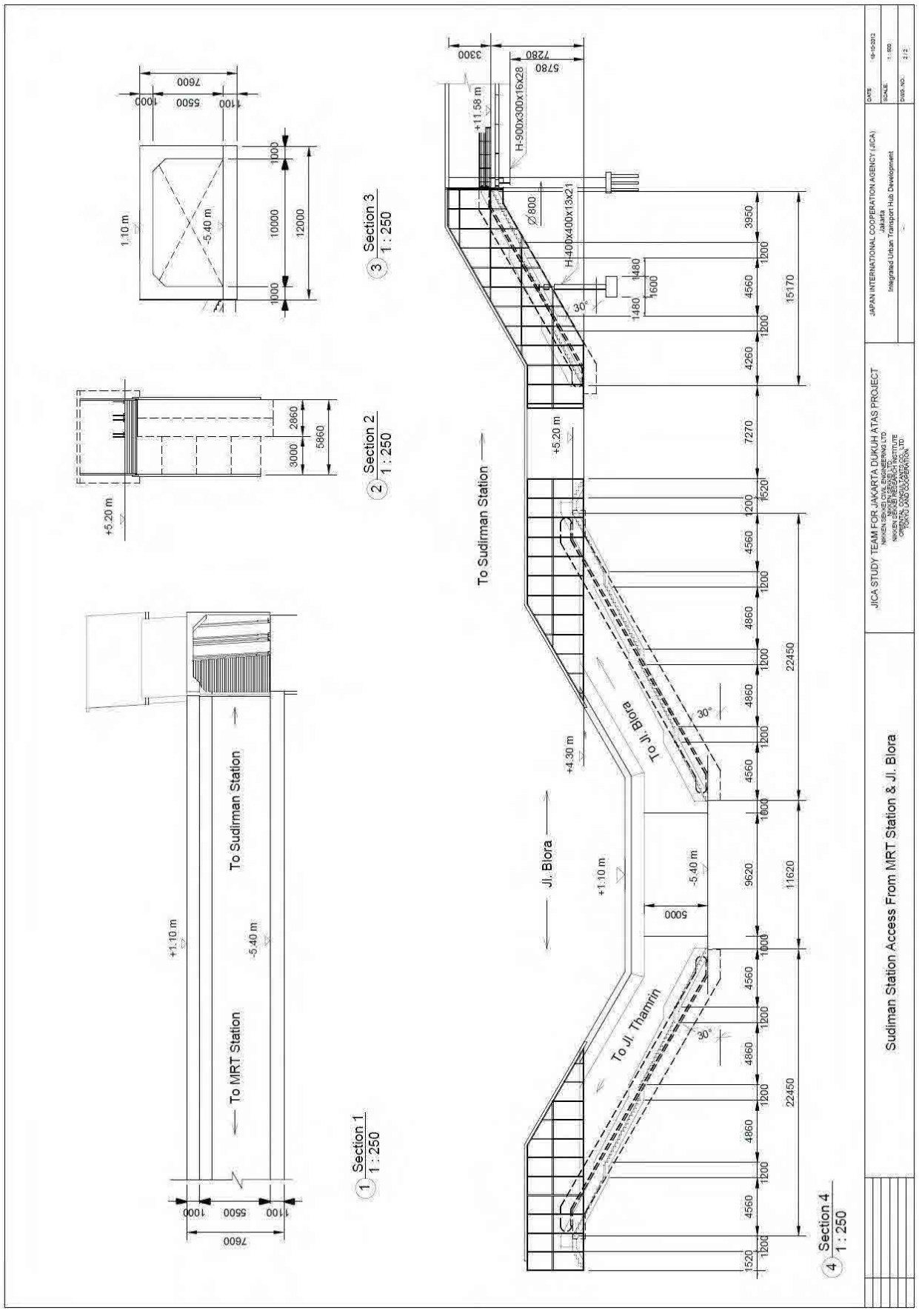


Fig-4.4.6 Cross-section View of Underground Passageway on Thamrin Street and East side of Thamrin Street

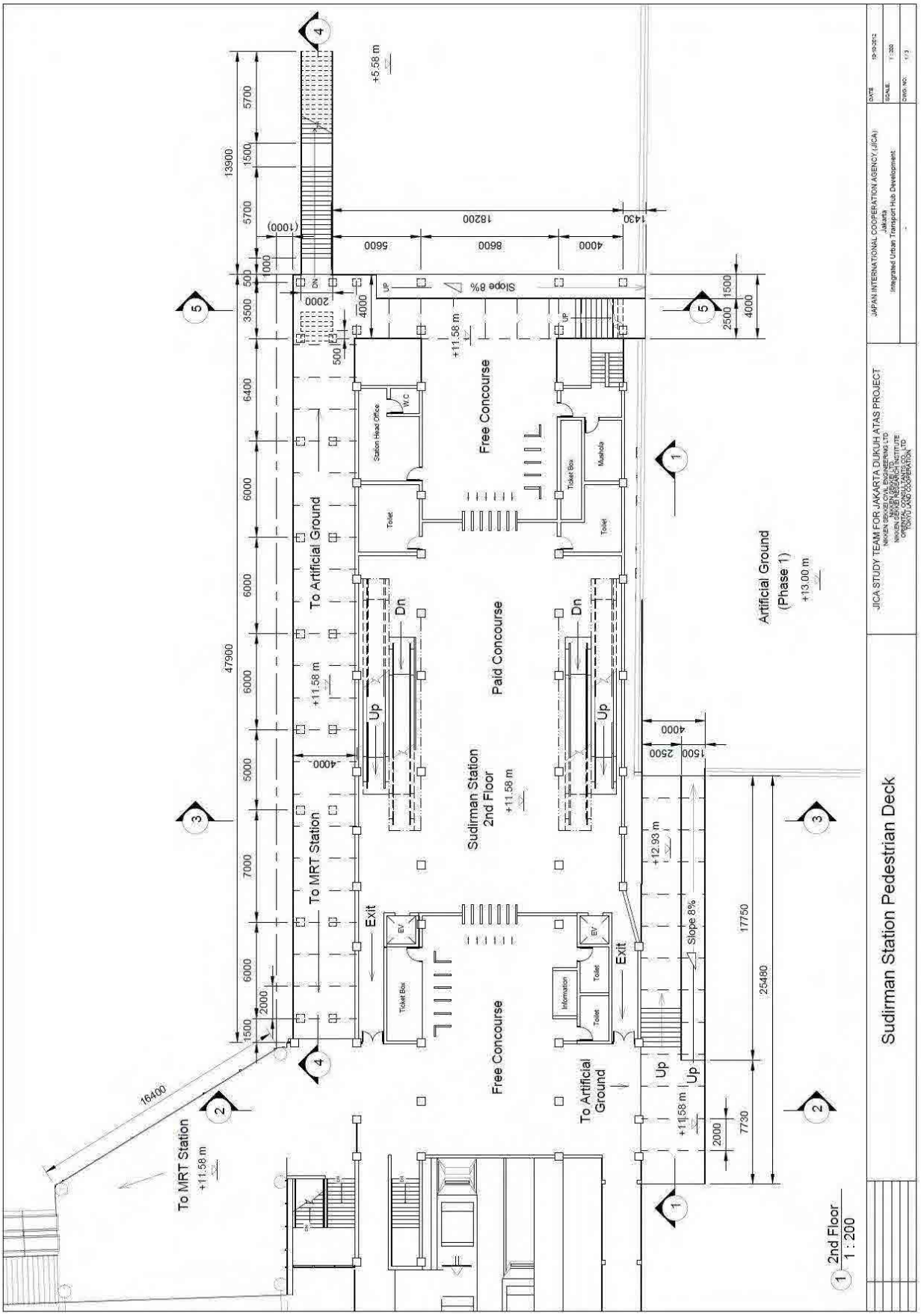


Fig-4.4.7 Plan View of Passageway between Sudirman Station and Artificial Ground, around Sudirman Station

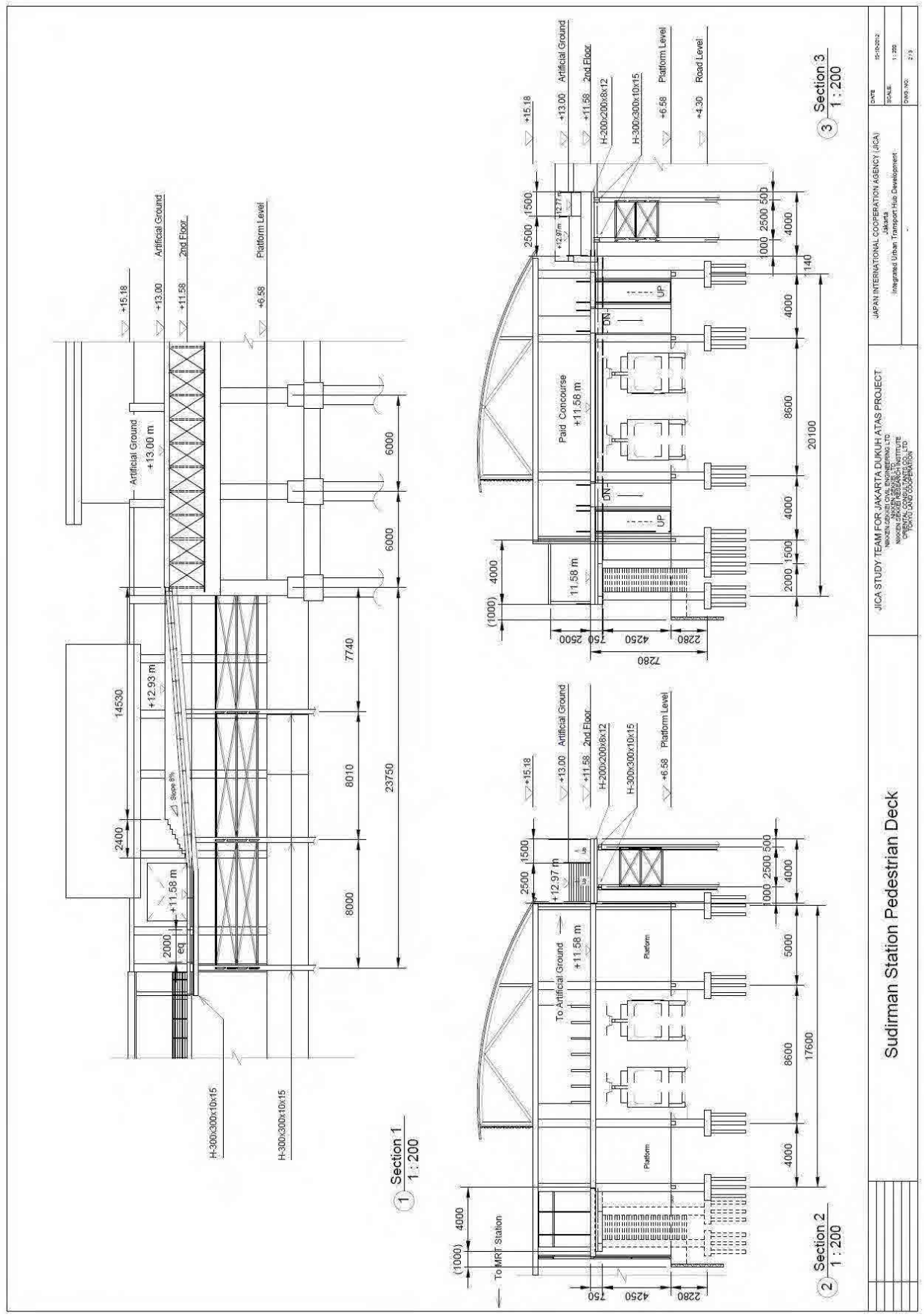


Fig-4.4.8 Cross-section View of Passageway between Sudirman Station and Artificial Ground, around Sudirman

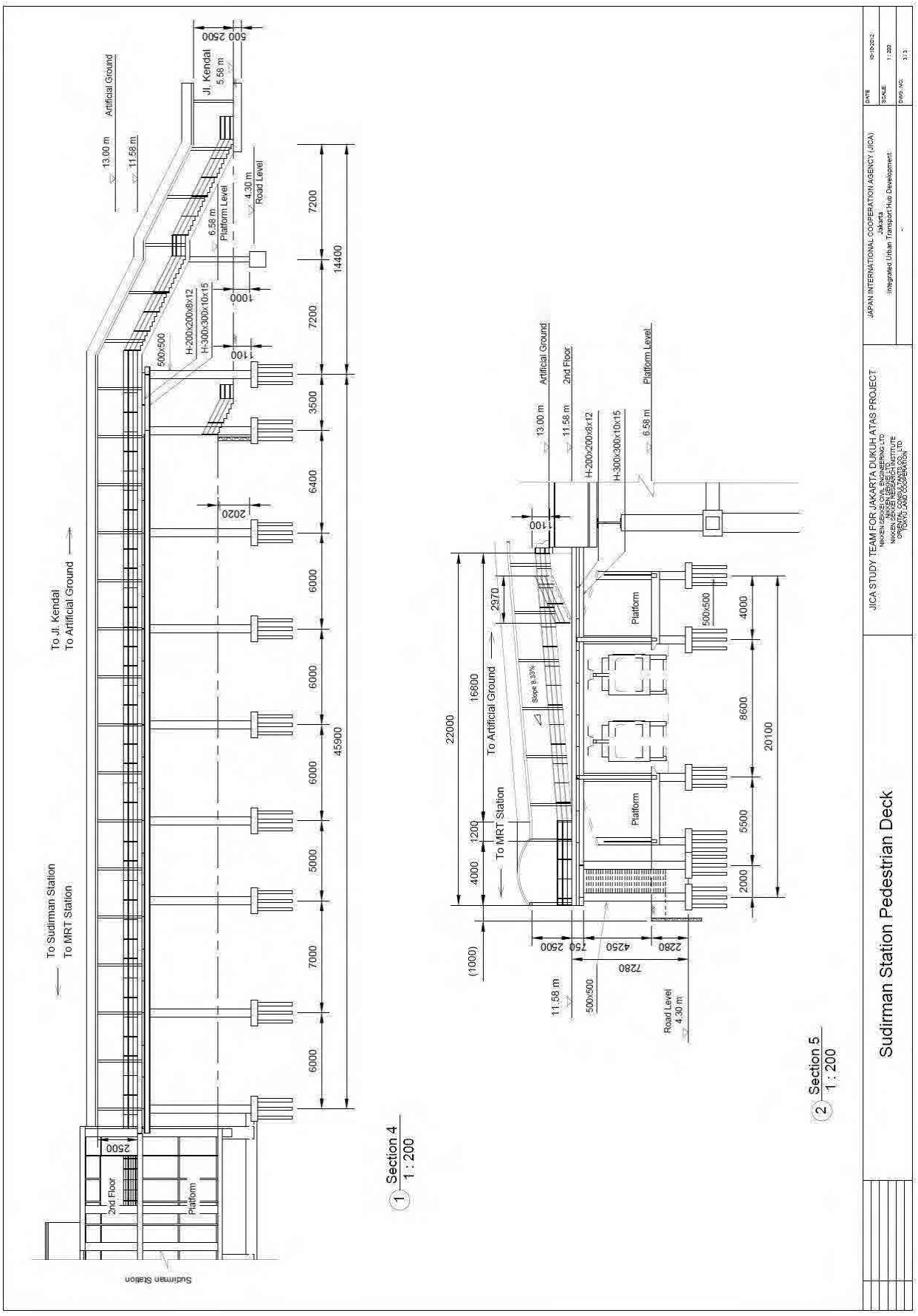


Fig-4.4.9 Cross-section View of Passageway between Sudirman Station and Artificial Ground, around Sudirman

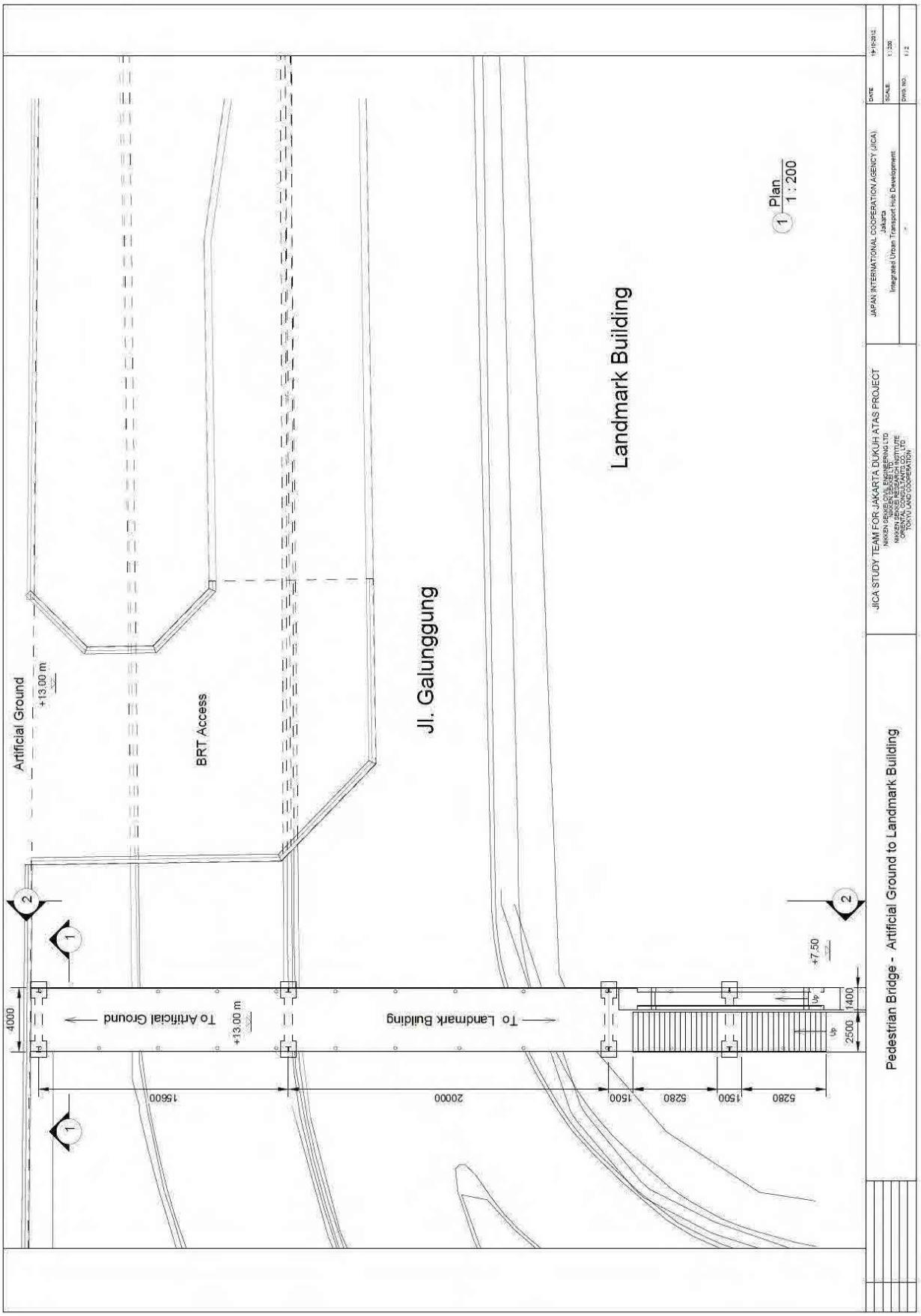


Fig-4.4.10 Plan View of Passageway between Artificial Ground and South/East Block

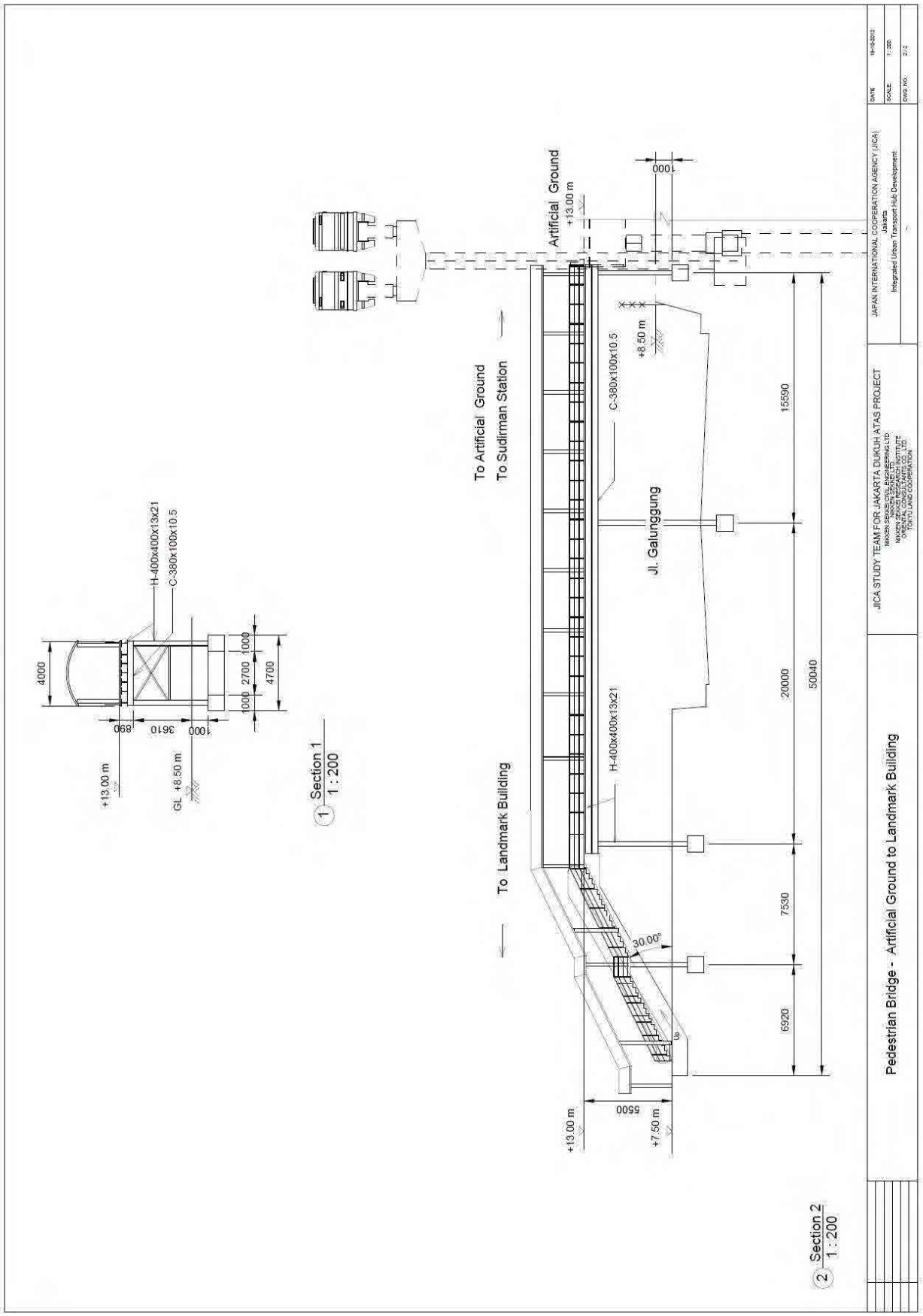


Fig-4.4.11 Cross-section View of Passageway between Artificial Ground and South/East Block

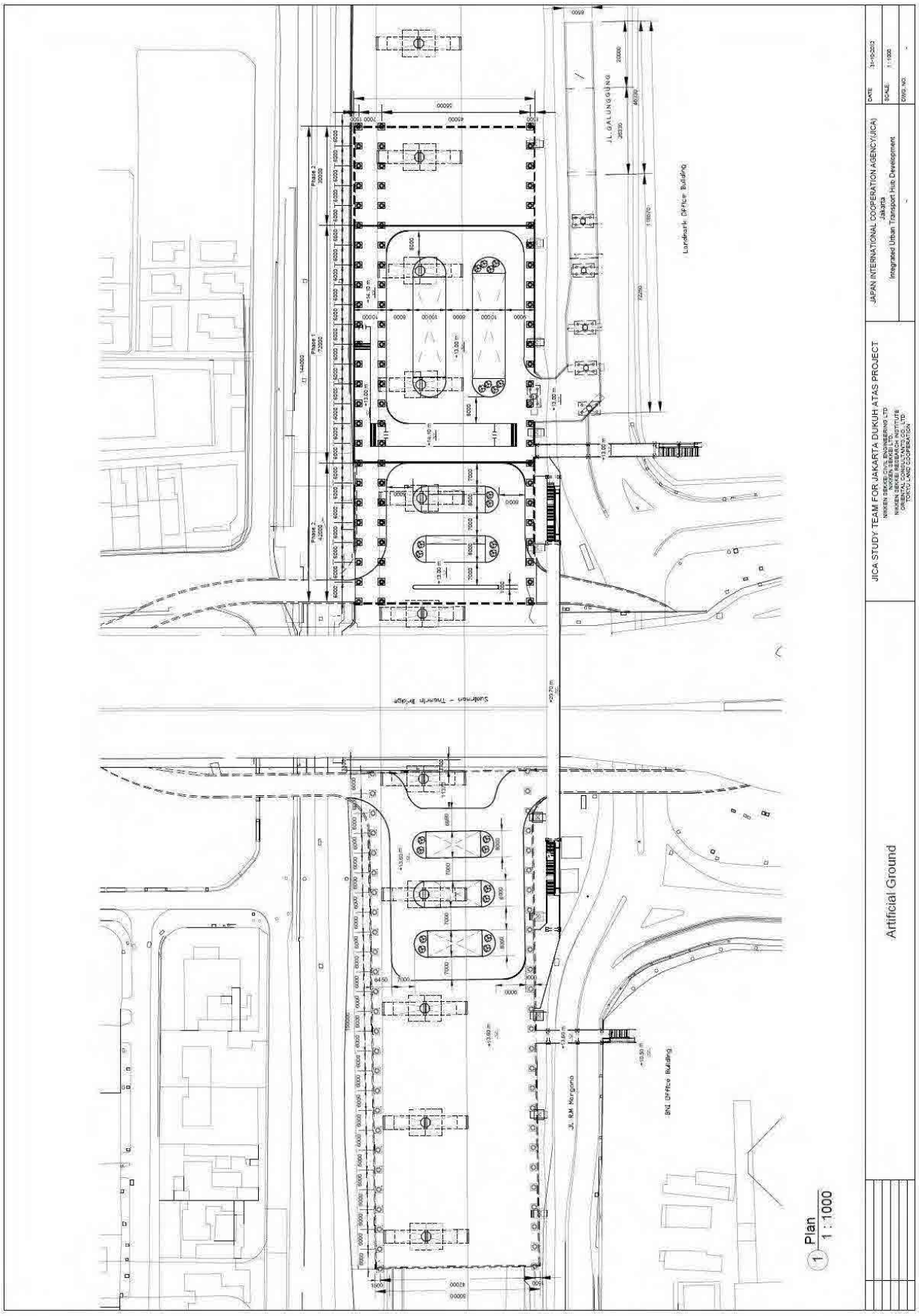


Fig-4.4.12 Plan View of Artificial Ground

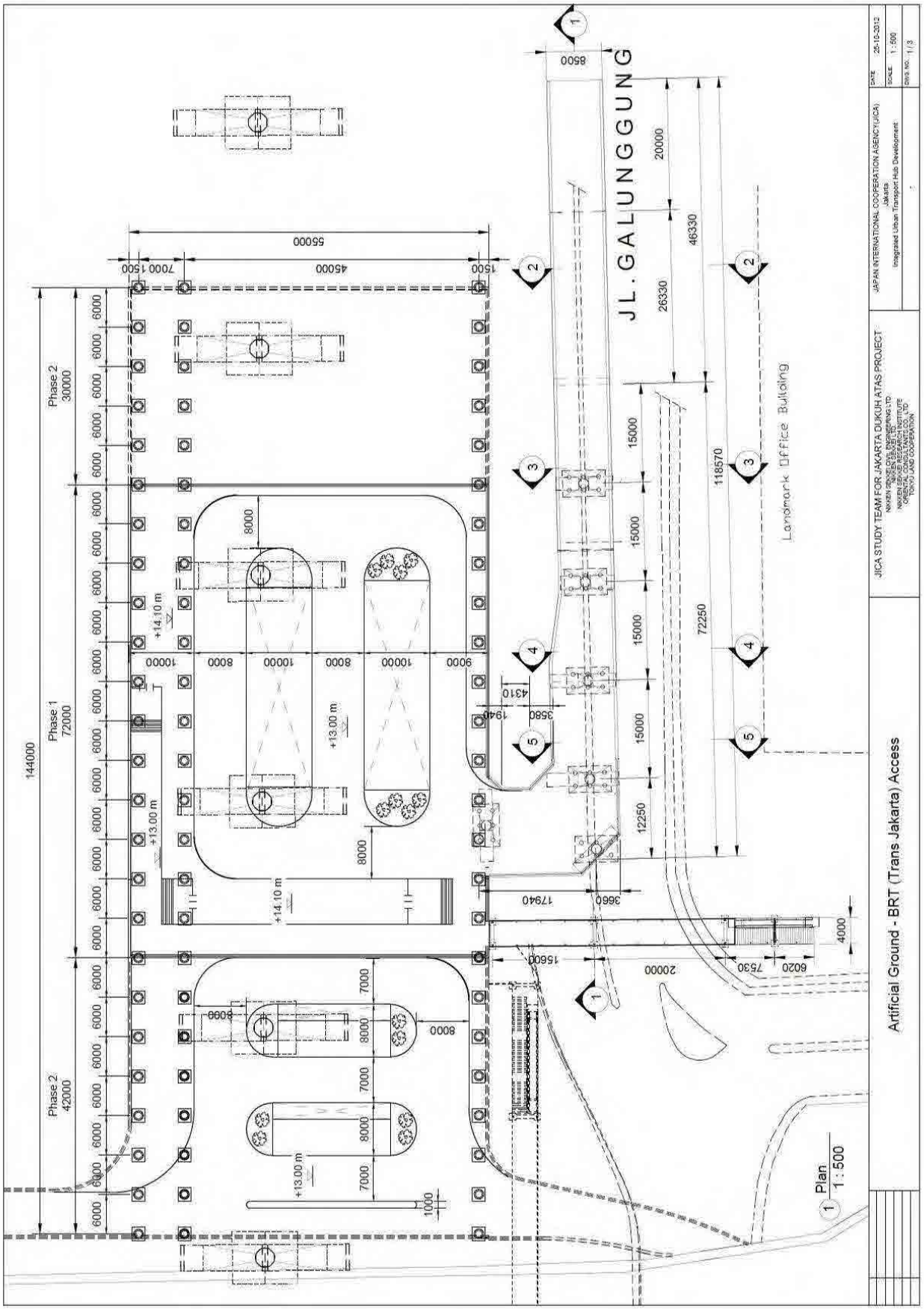


Fig-4.4.13 Plan View of Artificial Ground (Phase-1)

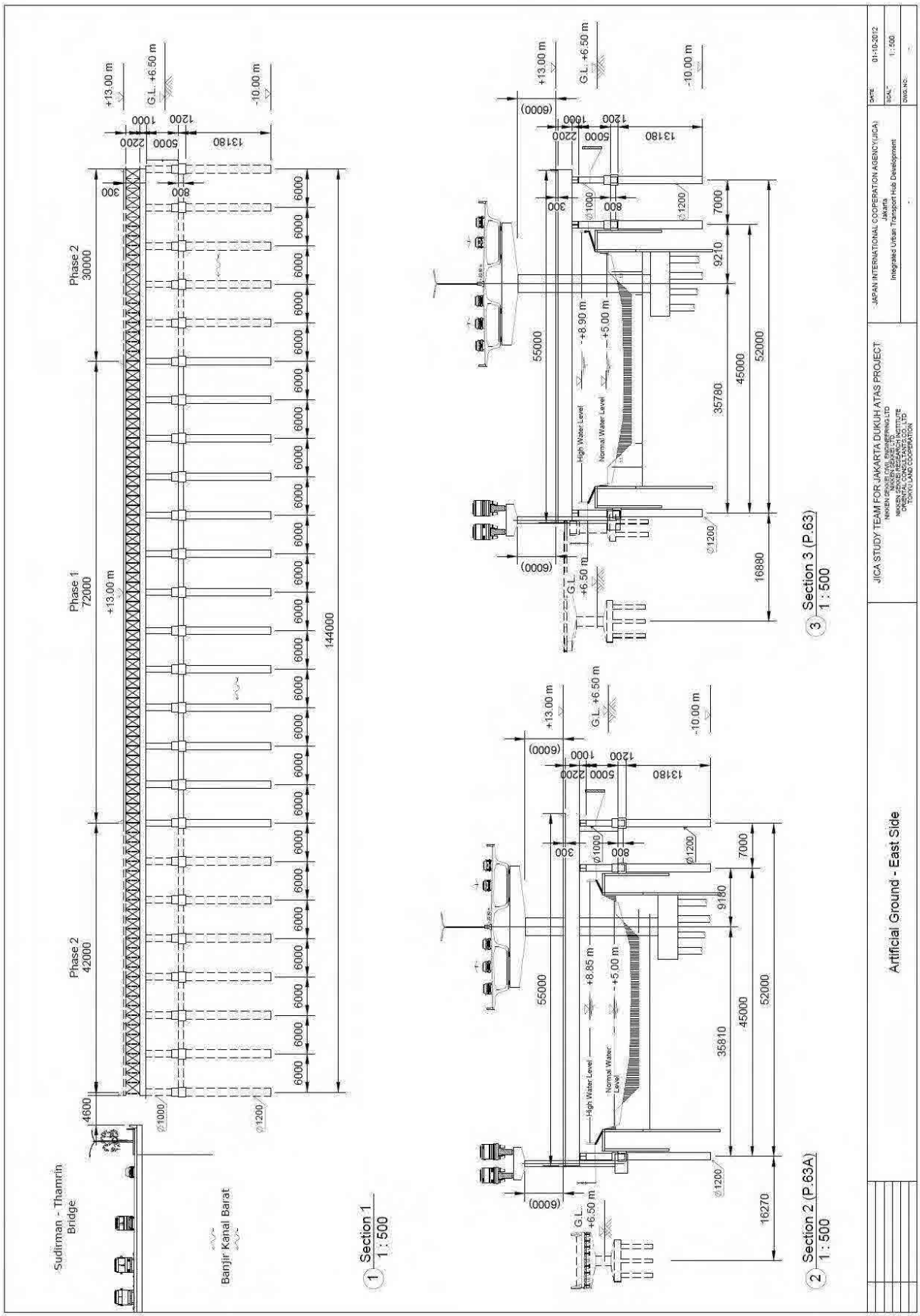


Fig-4.4.14 Cross-section View of Artificial Ground (Phase-1)

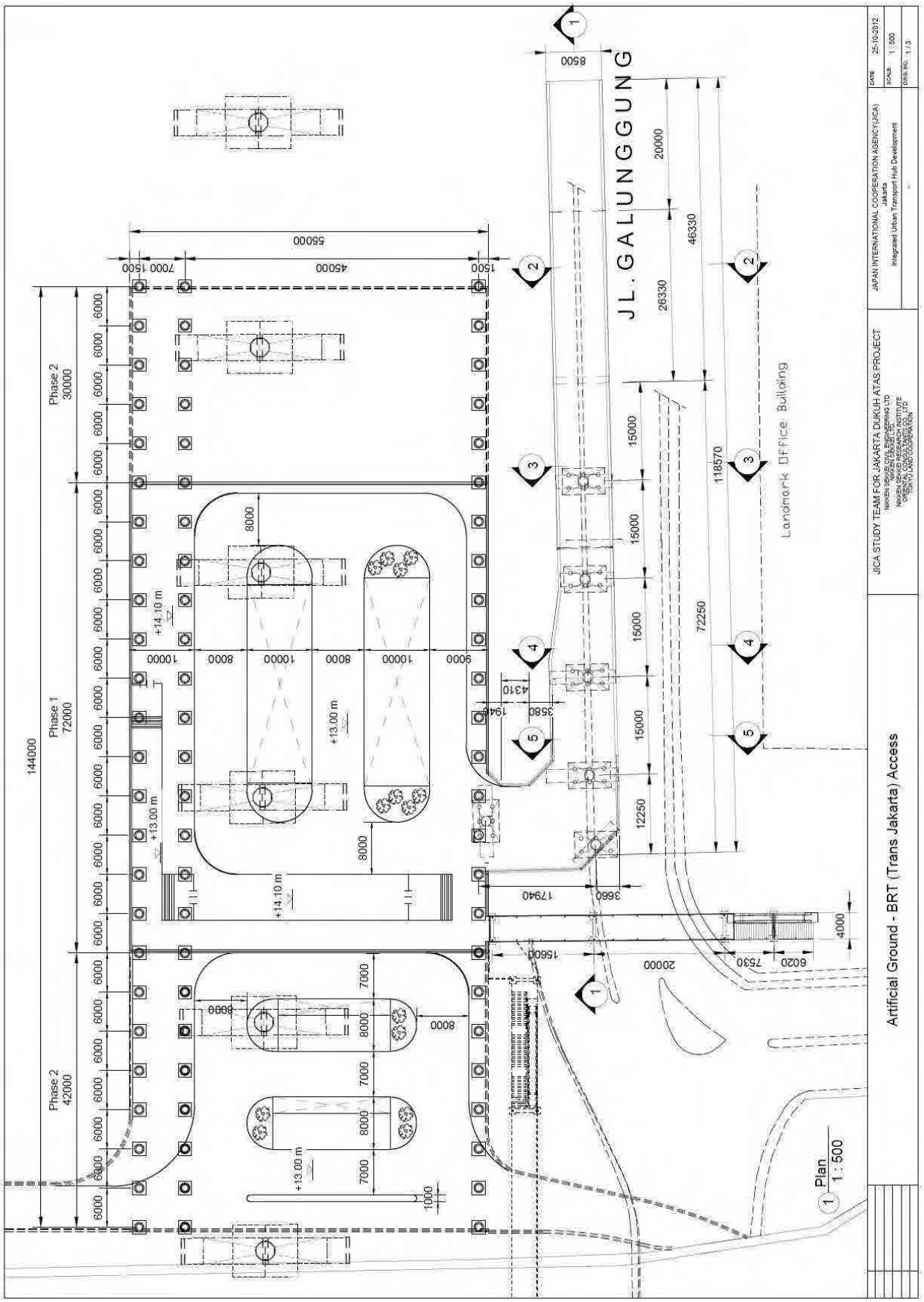


Fig-4.4.15 Plan View of BRT Access Road

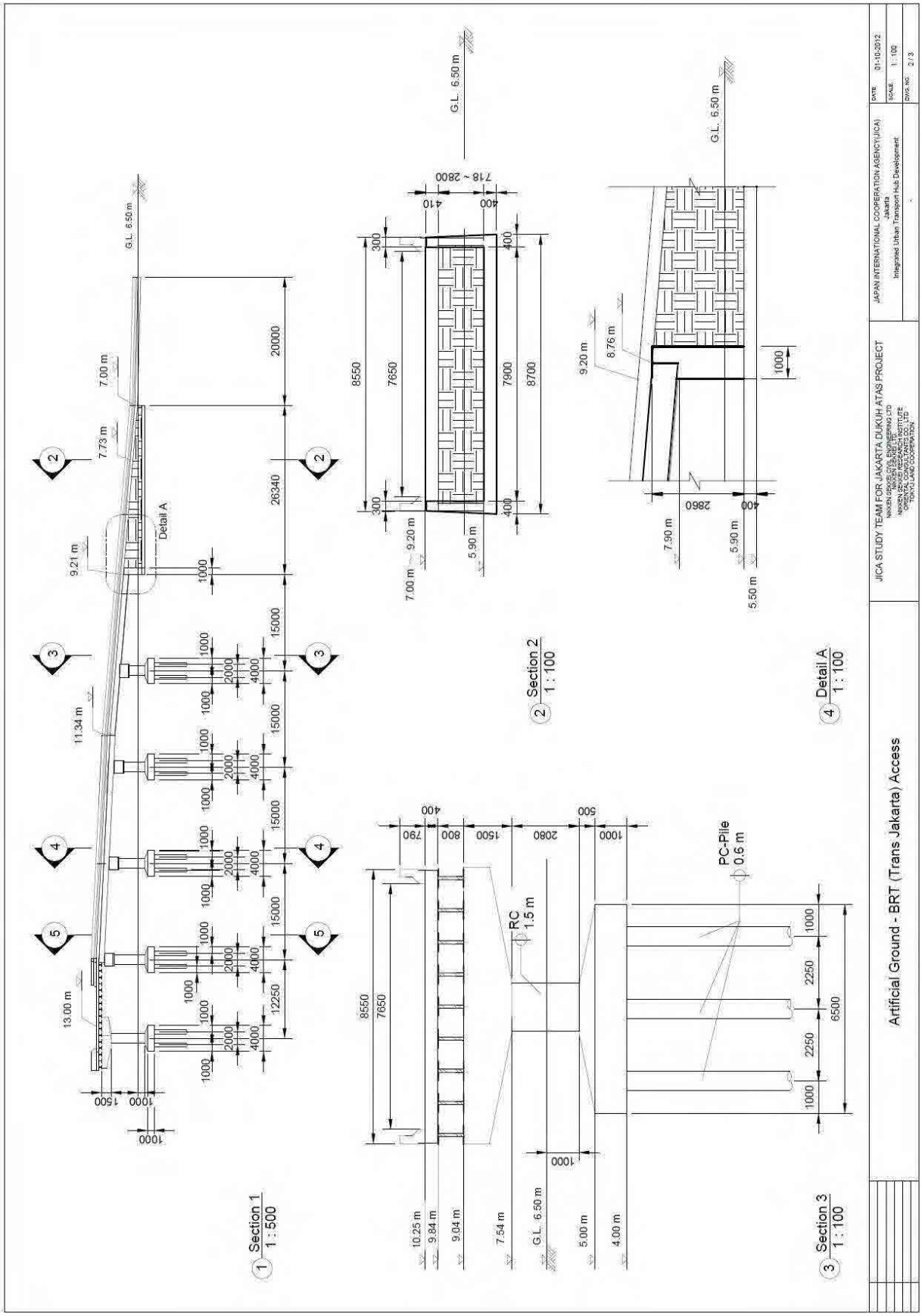


Fig-4.4.16 Cross-section View of BRT Access Road (1)

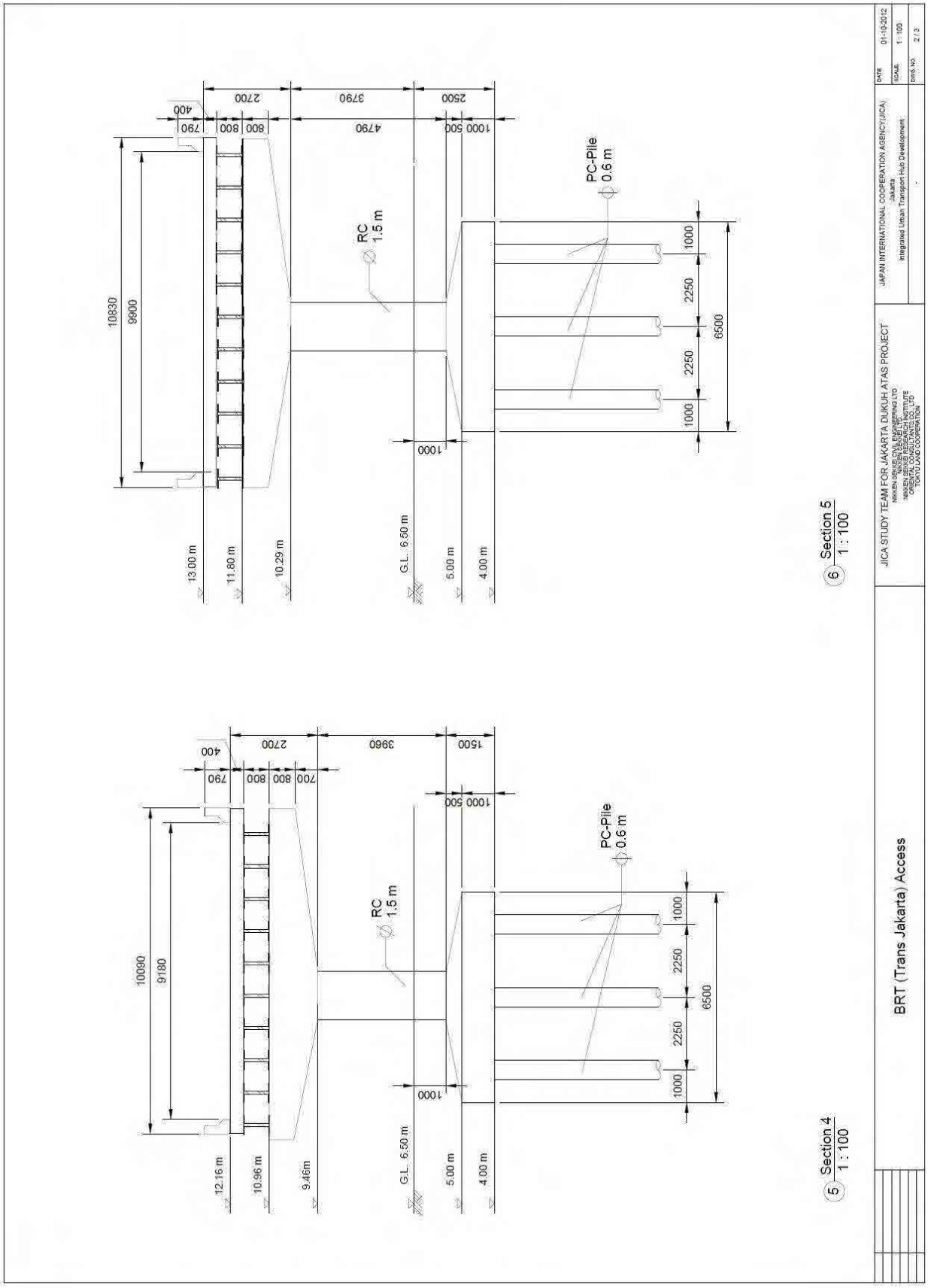


Fig-4.4.17 Cross-section View of BRT Access Road (2)

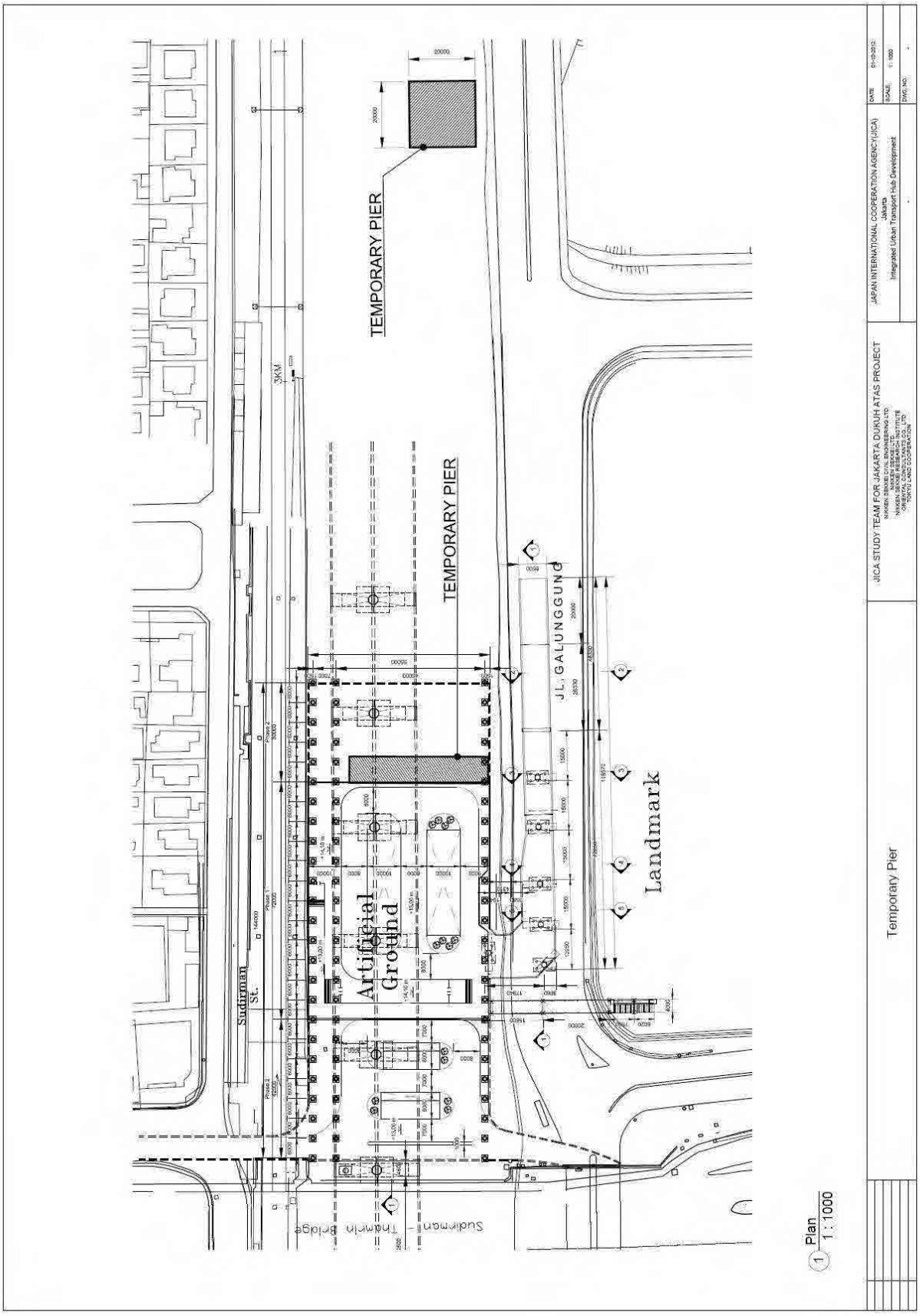


Fig-4.4.18 Plan View of Temporary Pier

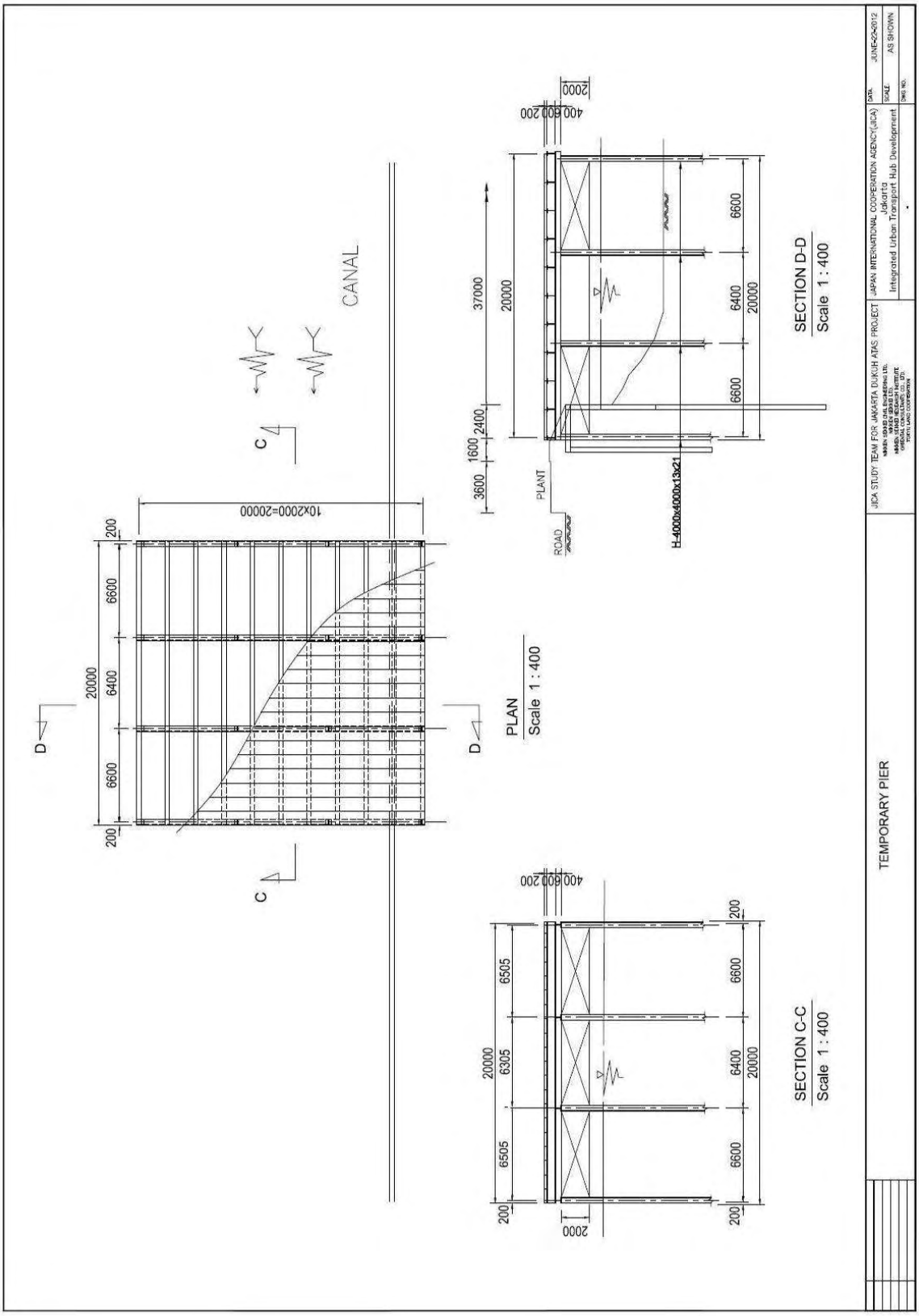


Fig-4.4.19 Cross-section View of Temporary Pier (1)

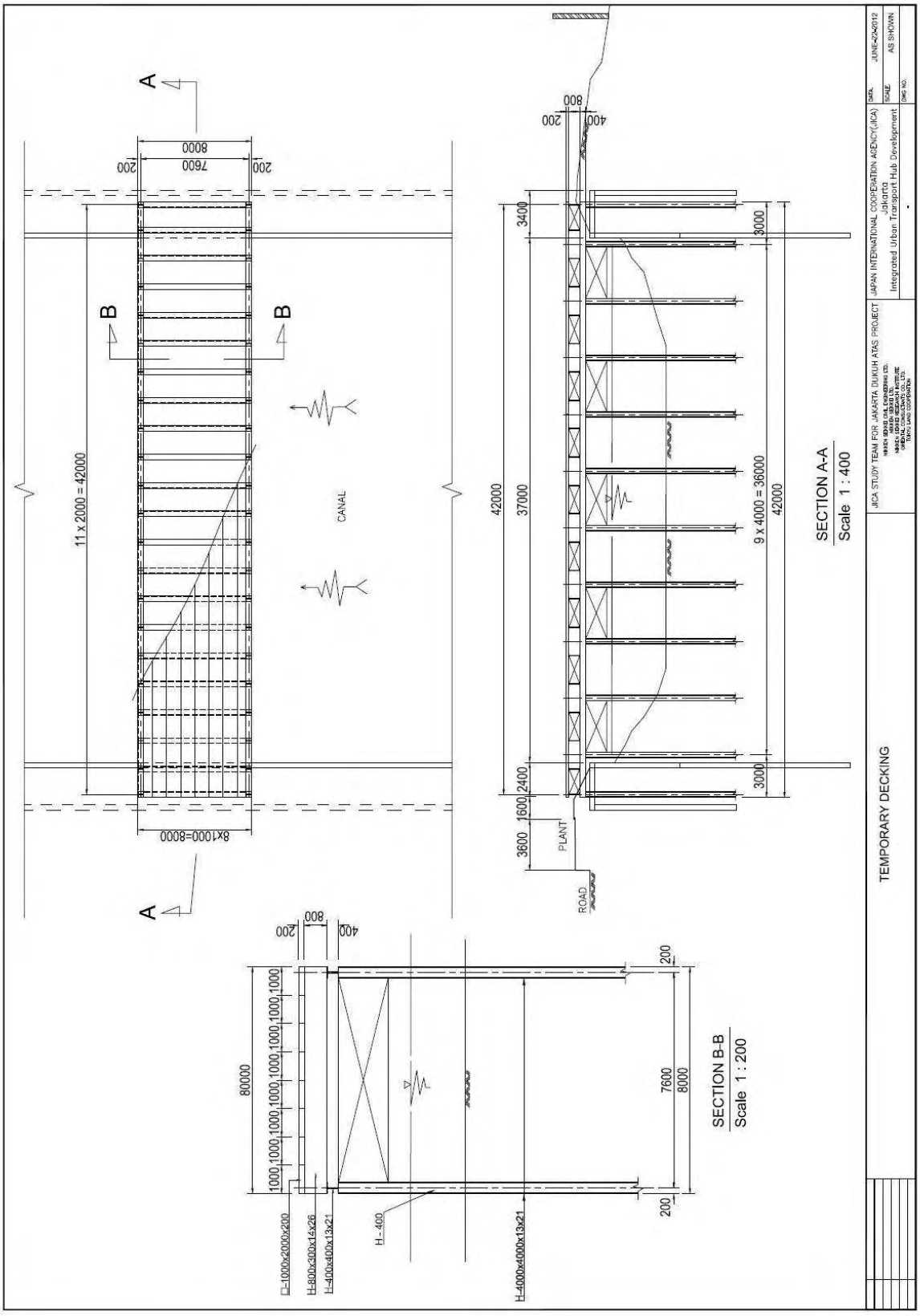


Fig-4.4.20 Cross-section View of Temporary Pier (2)

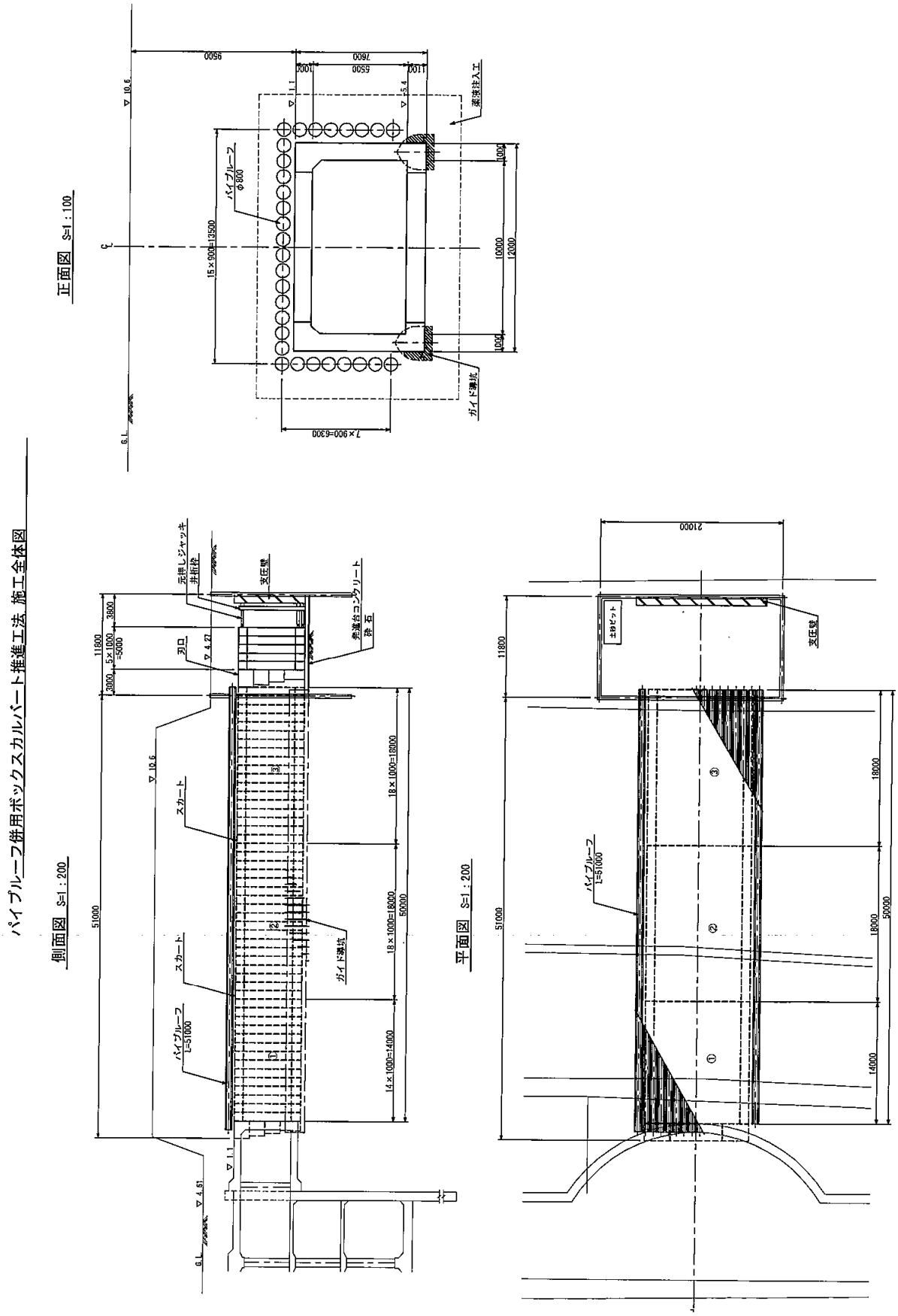


Fig-4.21 Construction Plan Drawing of Underground Passageway on Thamrin Street

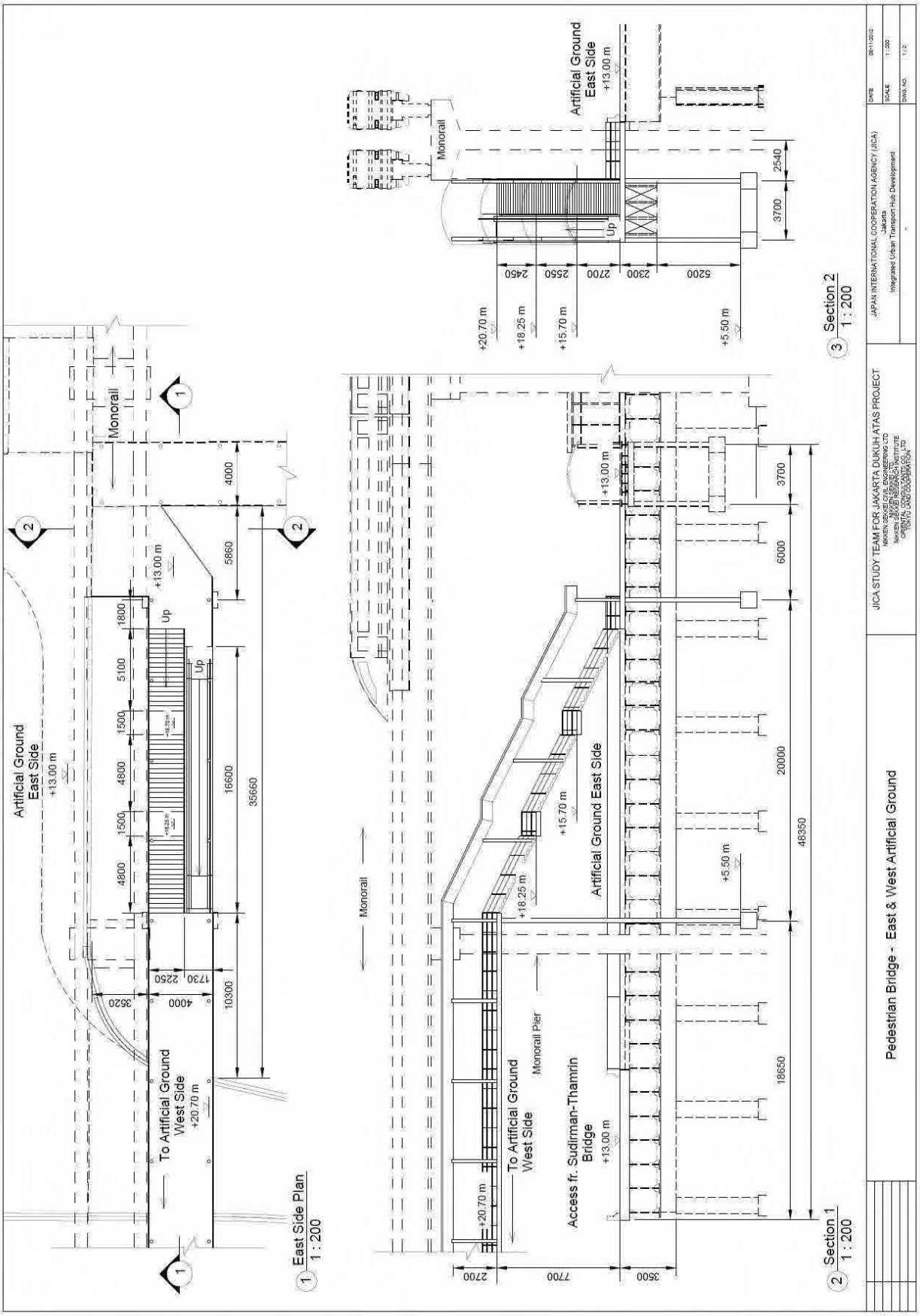


Fig-4.4.22 Plan and Cross-section View of Passageway between East and West Artificial Ground

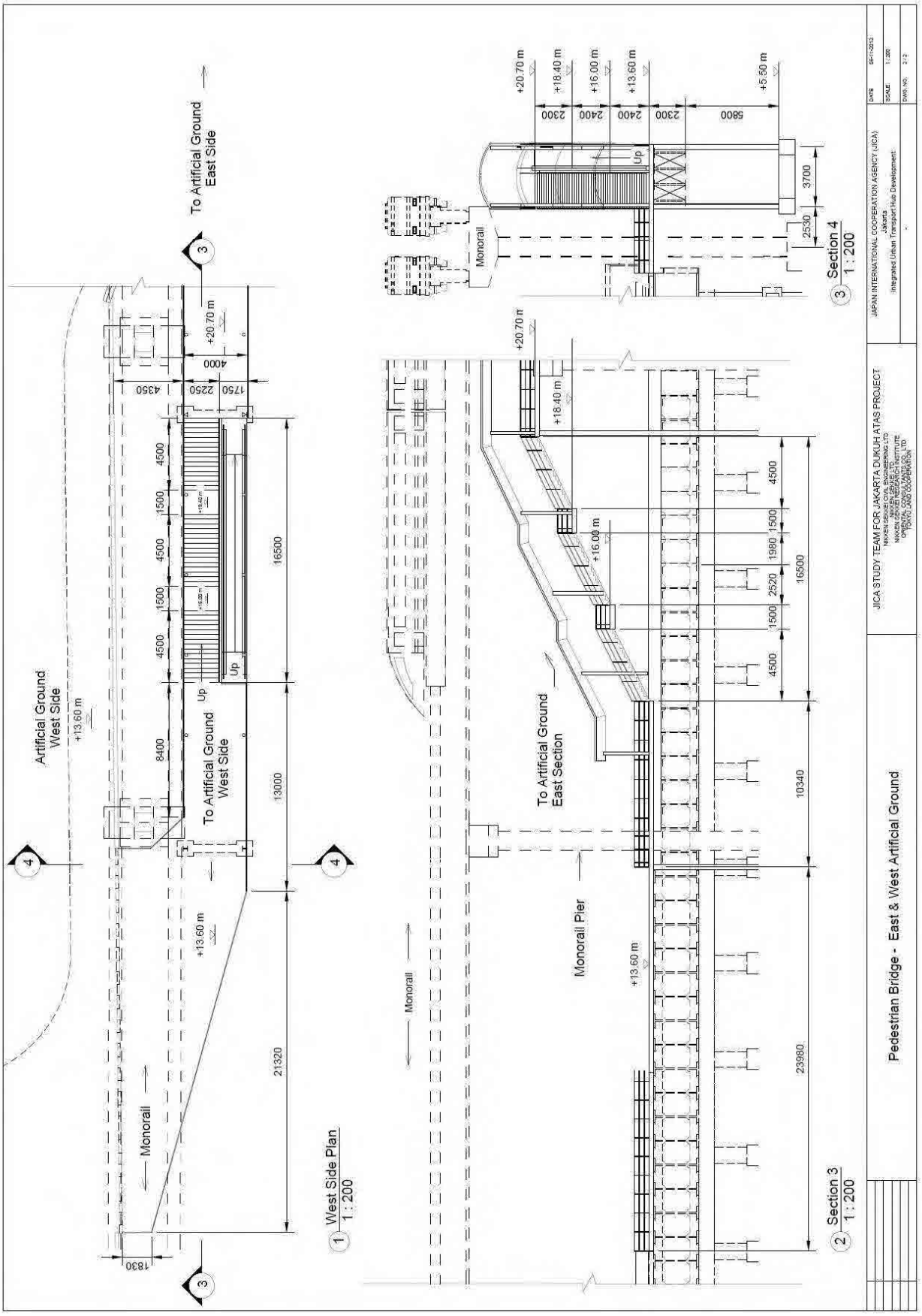


Fig-4.4.23 Plan and Cross-section View of Passageway between East and West Artificial Ground (2)

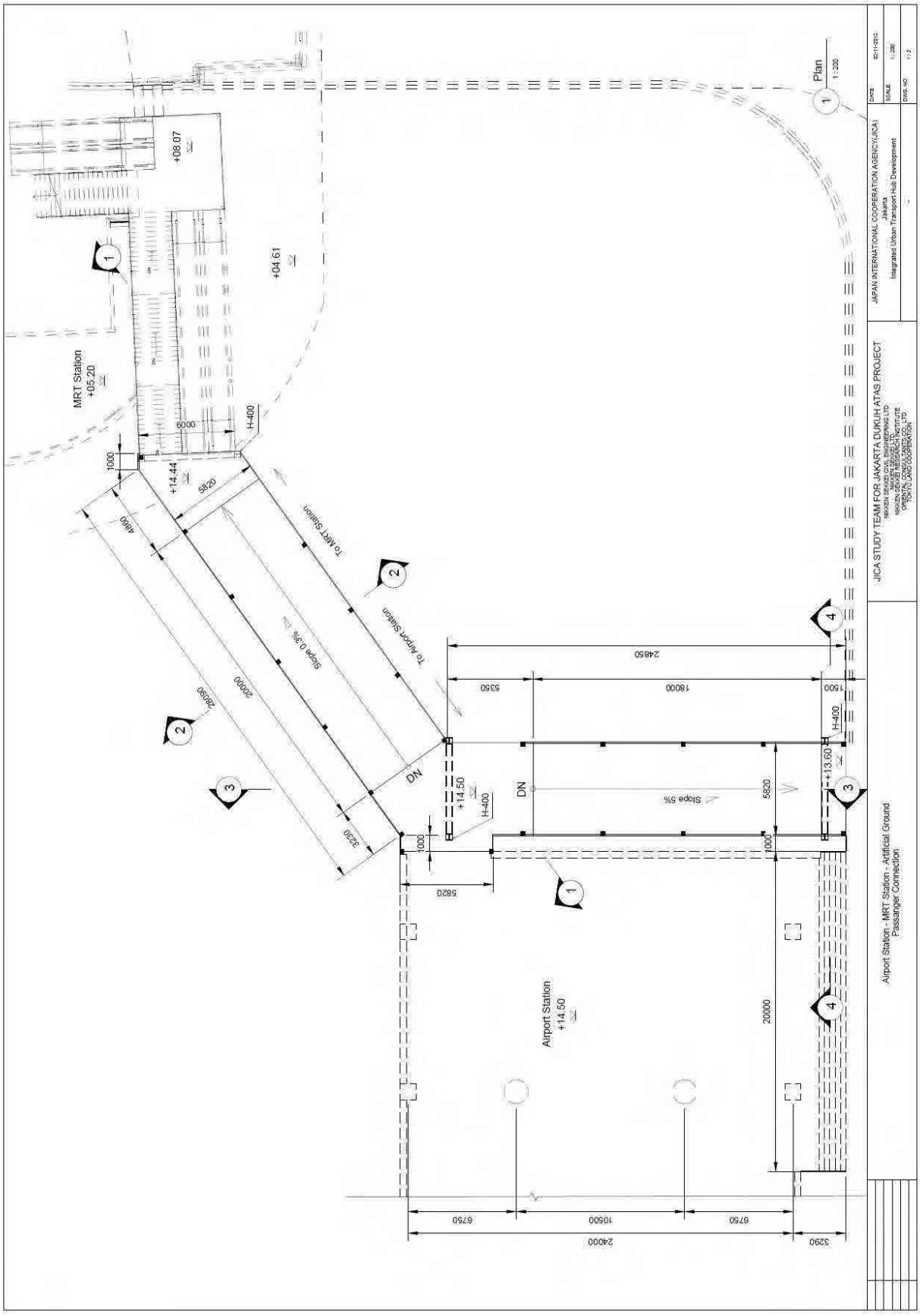


Fig-4.4.24 Plan View of Passageway between Airport Line Station and MRT Station

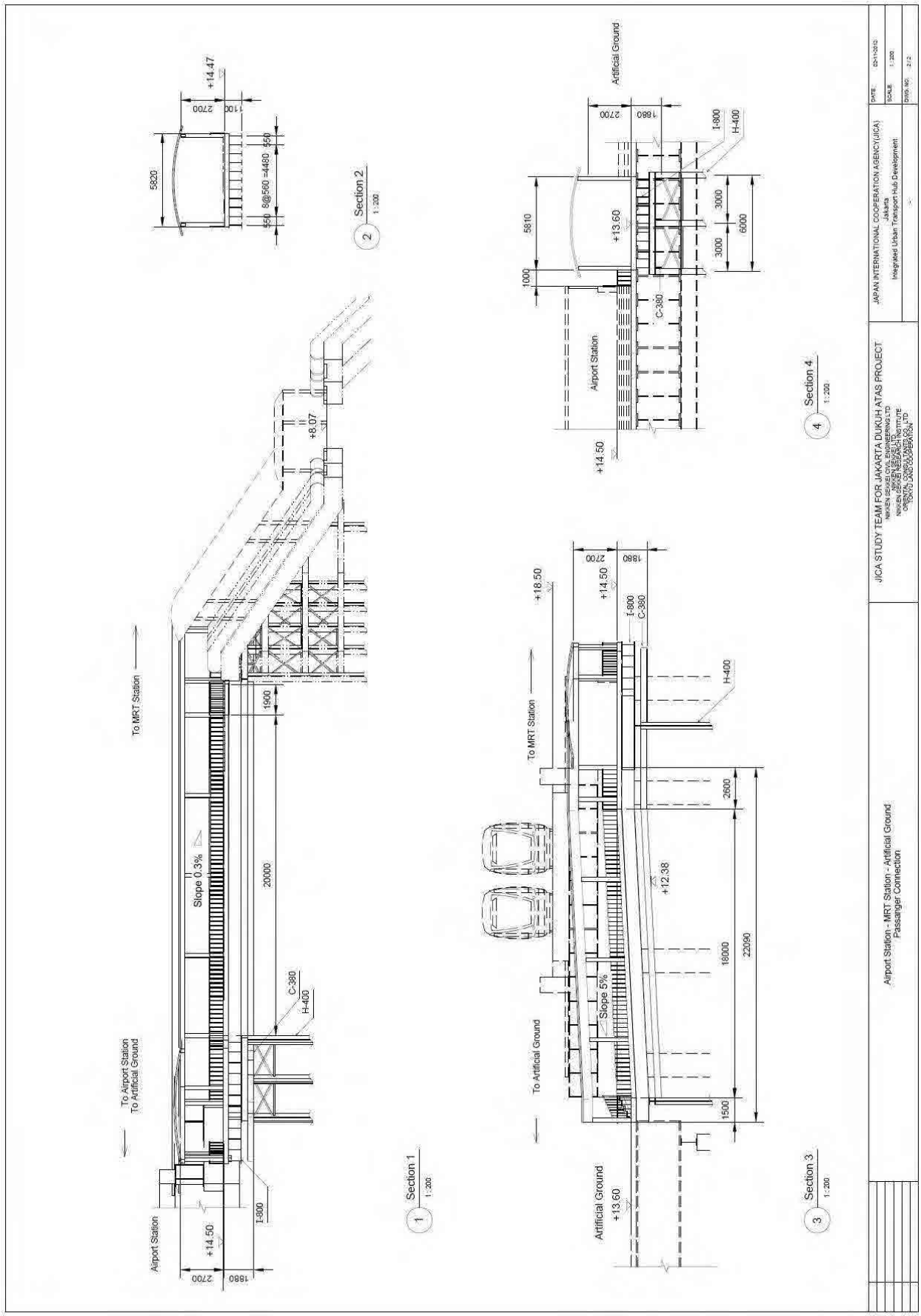


Fig-4.4.25 Cross-section View Passageway between Airport Line Station and MRT Station

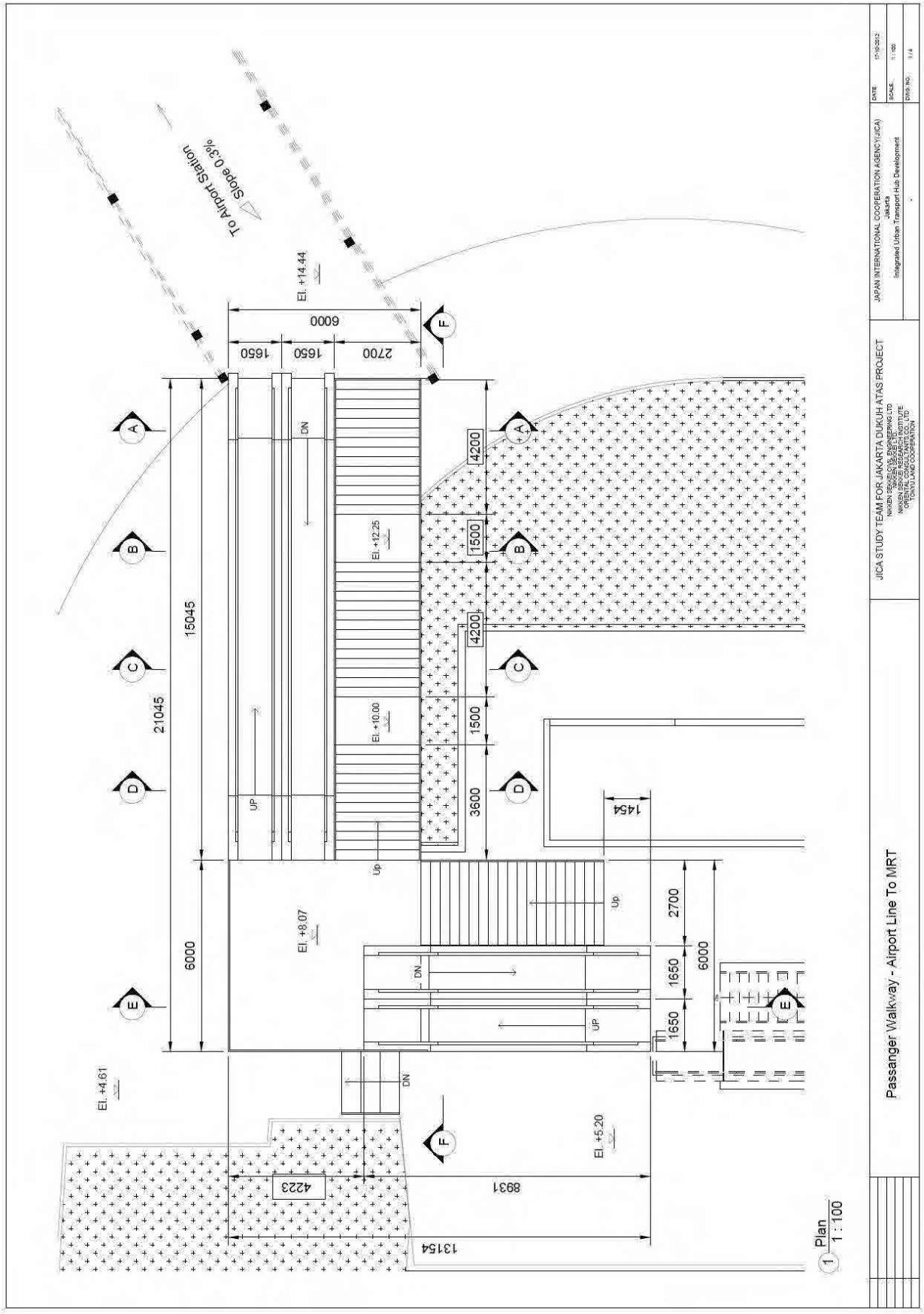


Fig-4.4.26 Plan View of Passageway stairs between Airport Line Station and MRT Station

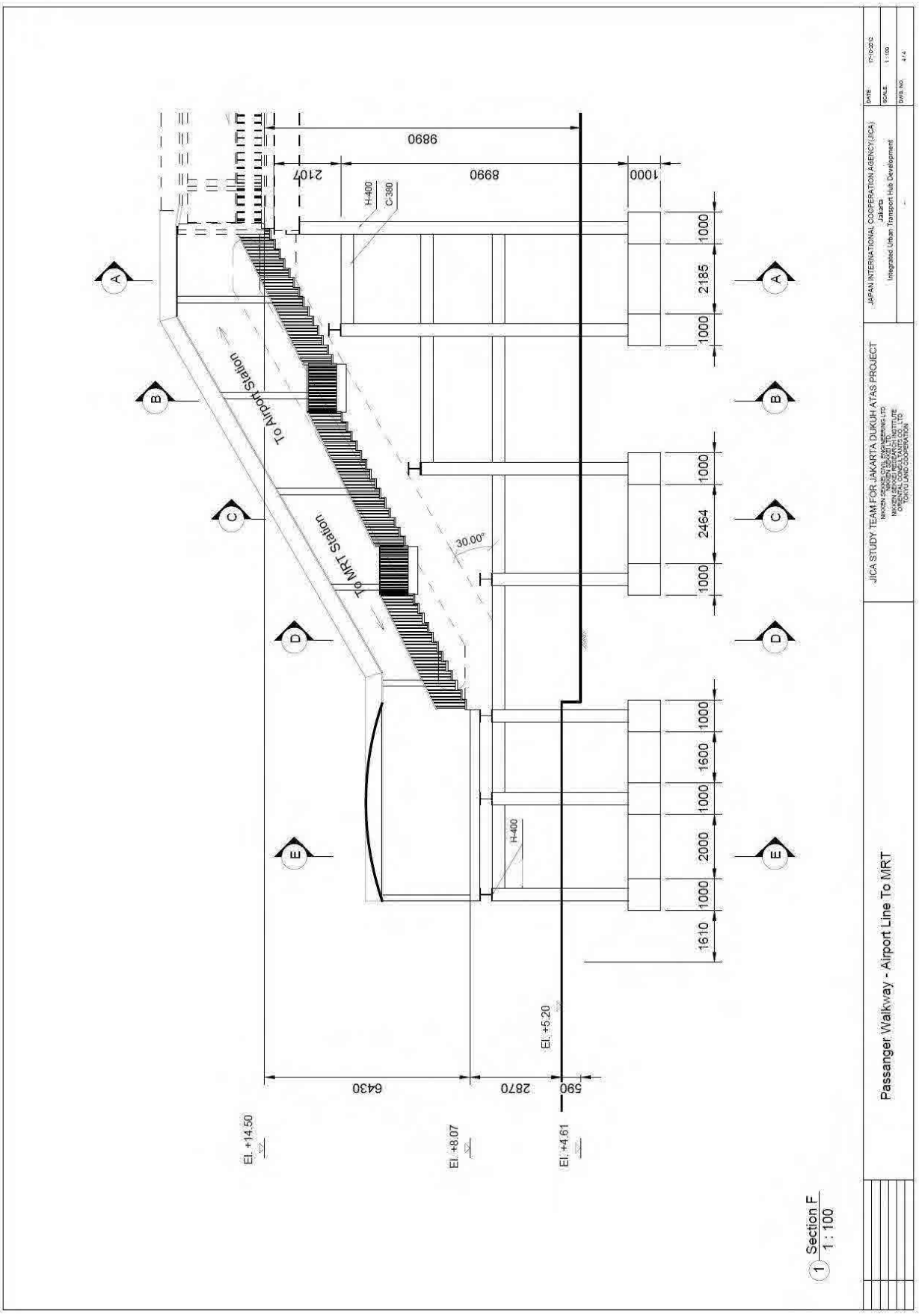


Fig-4.4.27 Cross-section View of Passageway stairs between Airport Line Station and MRT Station (1)

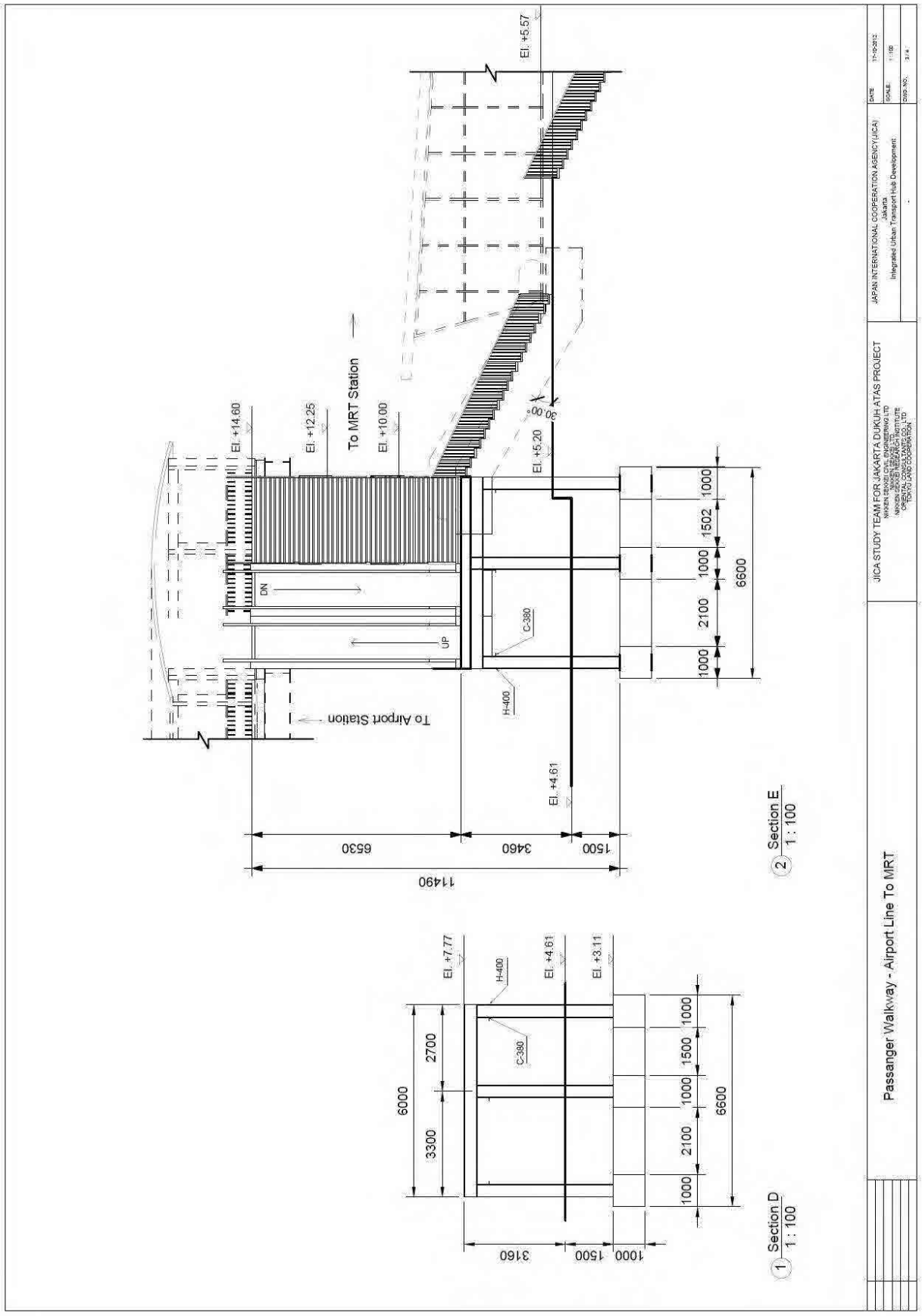


Fig-4.4.28 Cross-section View of Passageway stairs between Airport Line Station and MRT Station (2)

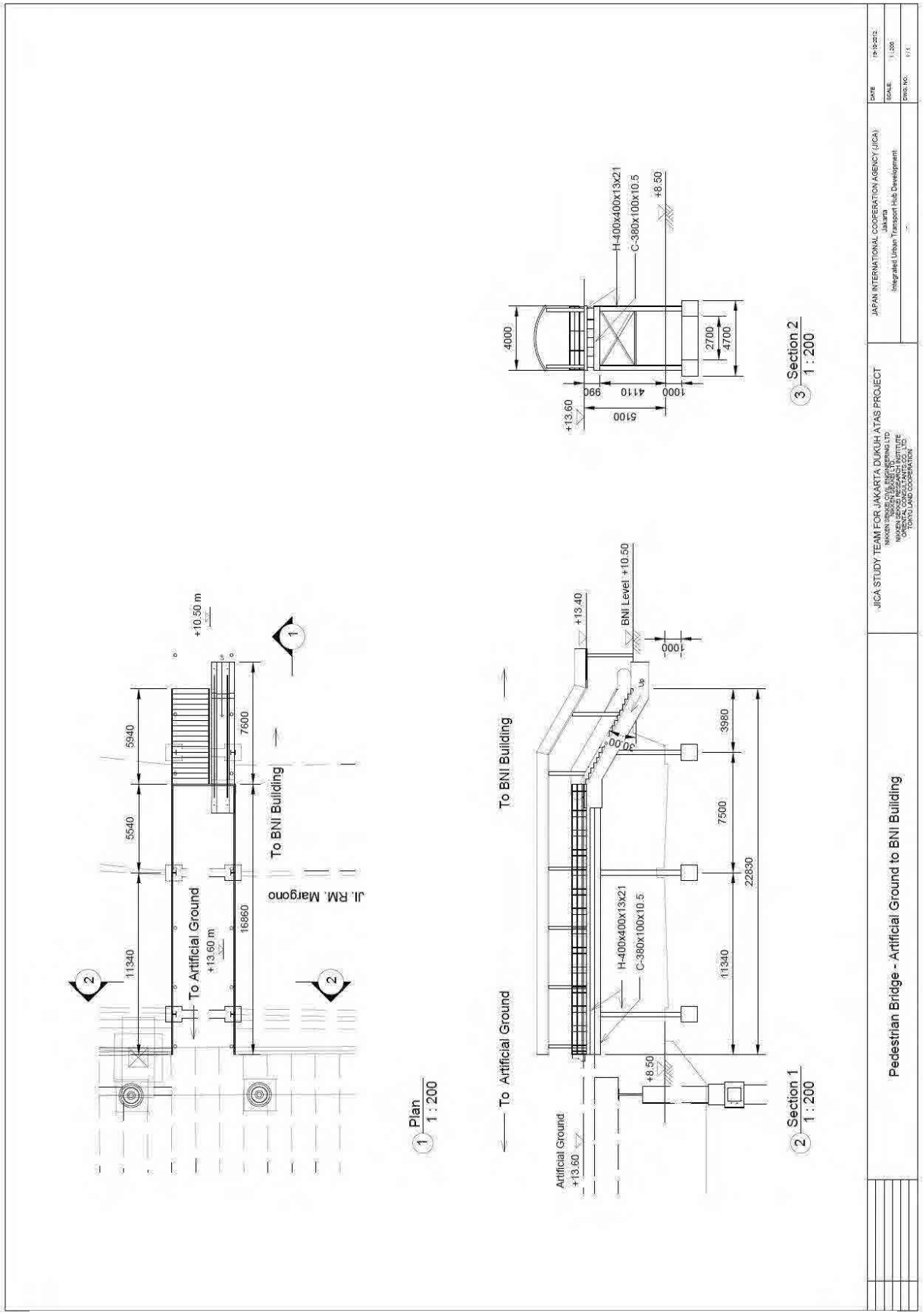


Fig-4.4.29 Plan View of Passageway between Artificial Ground and South/West Block

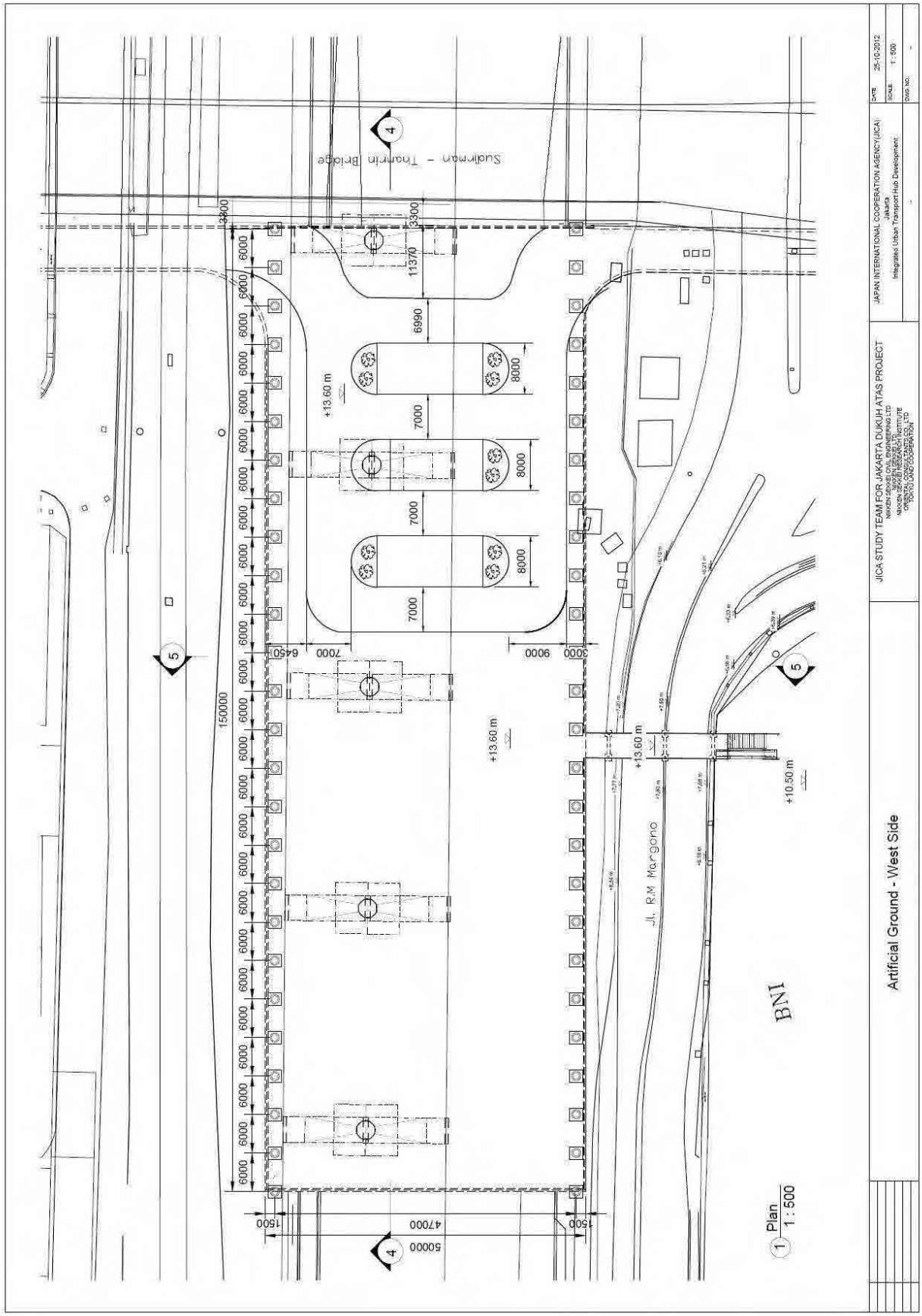


Fig-4.4.30 Plan View of Artificial Ground (Phase-2)

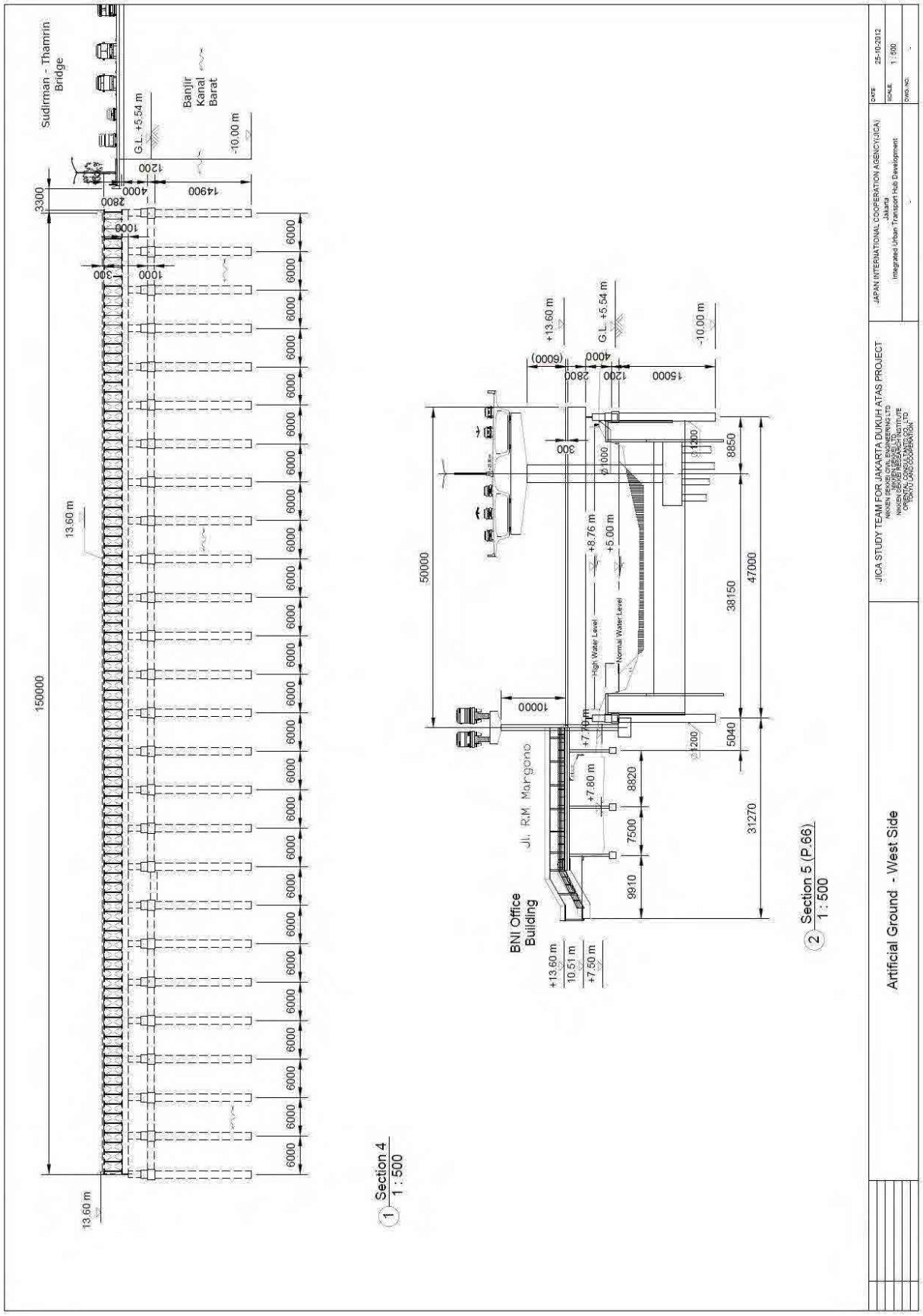


Fig-4.4.31 Cross-section View of Artificial Ground (Phase-2)

4) Station Facilities

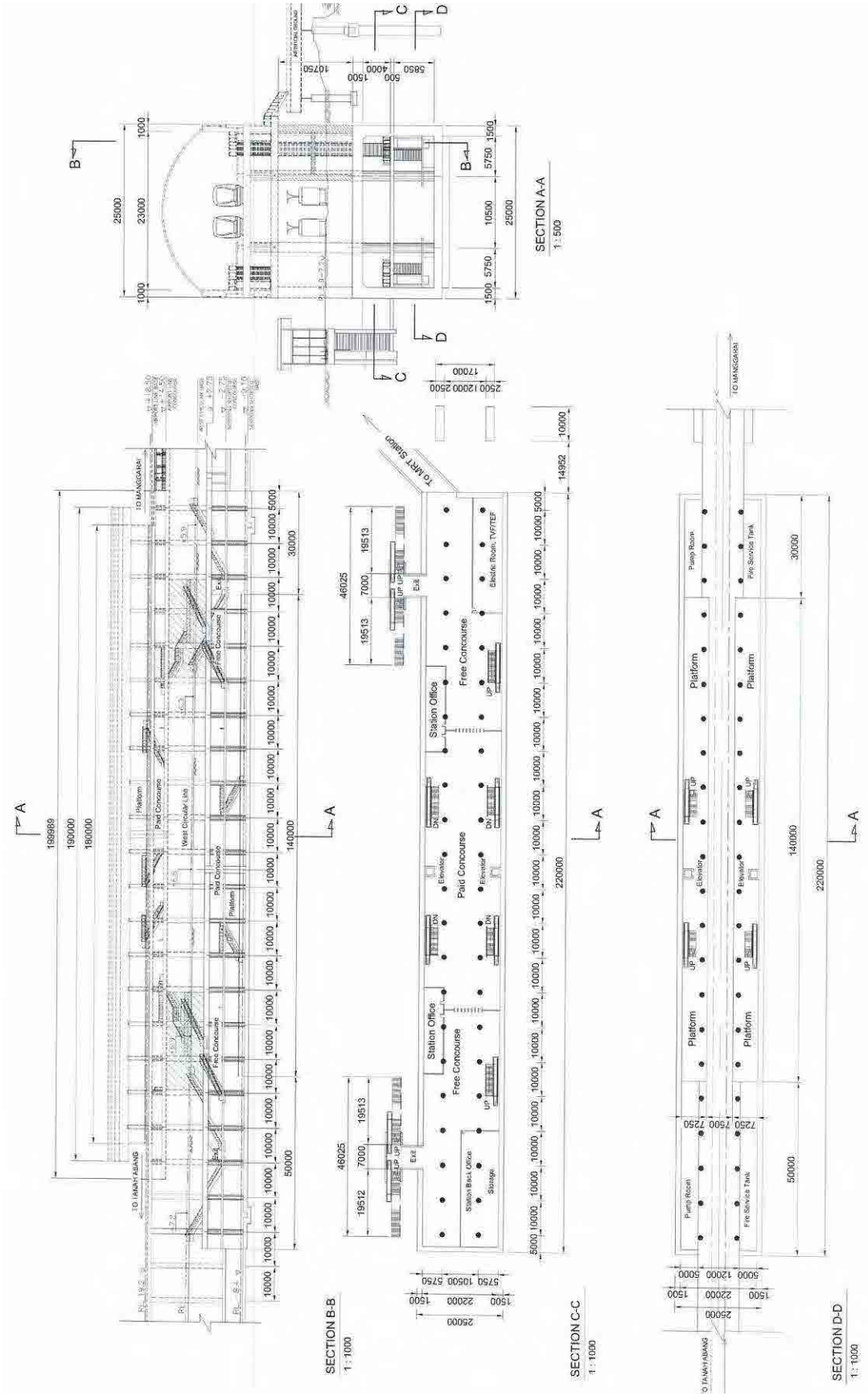


Fig-4.4.32 Plan Drawing of Serpong Line Station

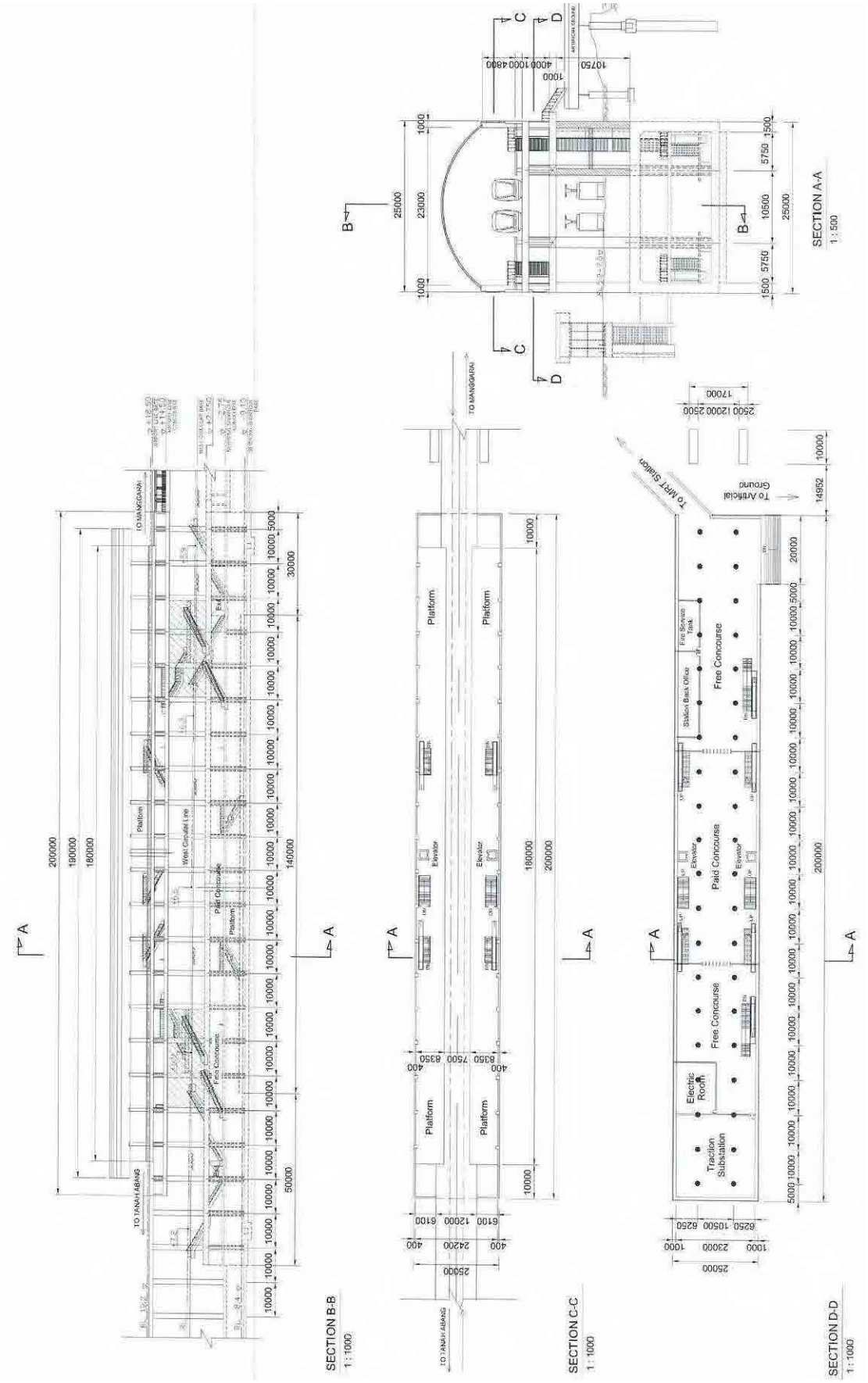


Fig-4.4.33 Plan Drawing of Airport Line Station

4.4.3 Complete View of the Constructed Facilities

1) Bird Eye View

Fig-4.4.34 After PHASE2 Dukuh Atas south side image (source：Study Team)

Fig-4.4.35 After PHASE2 Dukuh Atas north side image (source：Study Team)

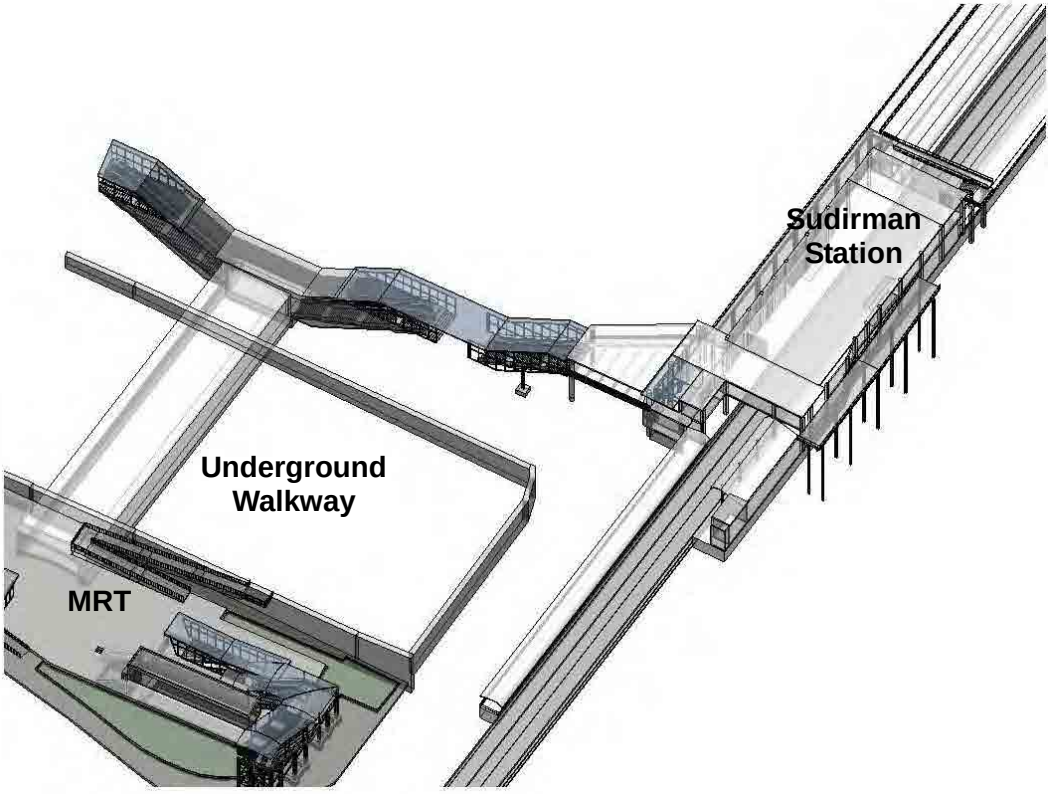


Fig-4.4.36 PHASE1 Underground walkway image (source：Study Team)

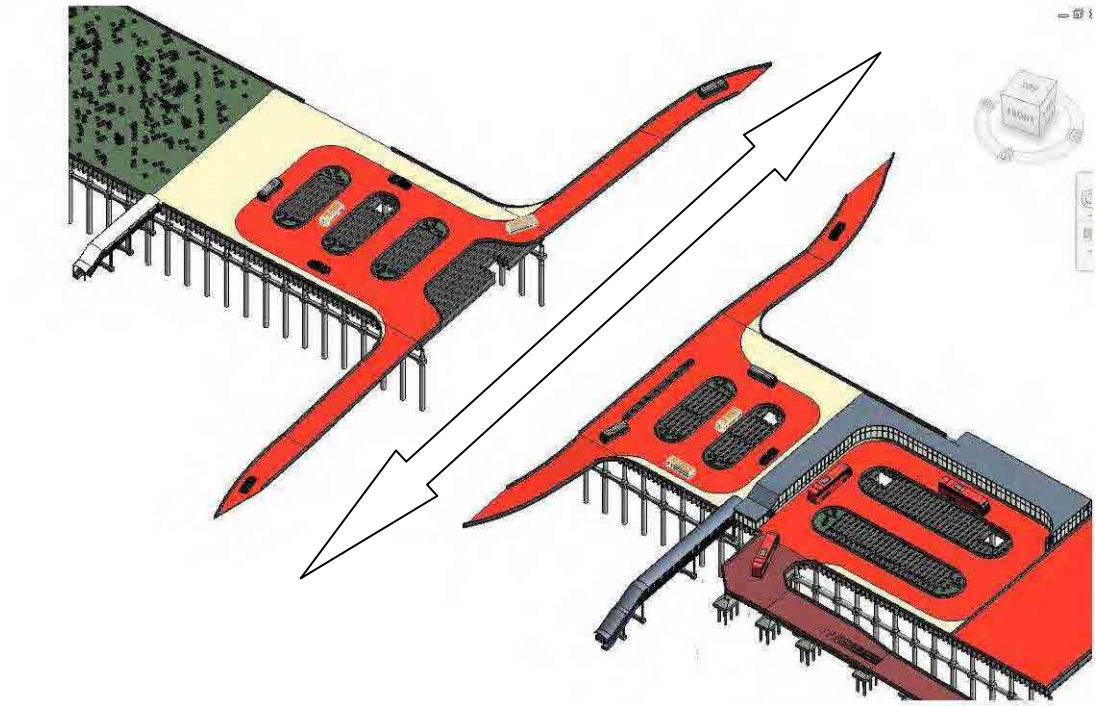


Fig-4.4.37 PHASE2 Artificial ground image (source：Study Team)

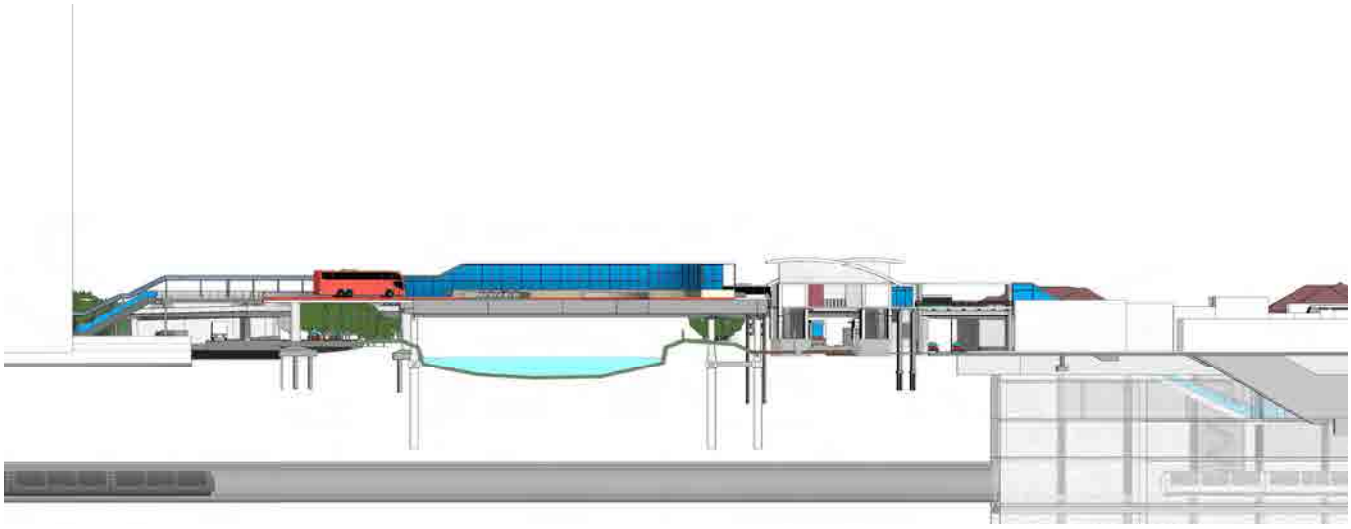


Fig-4.4.38 PHASE1 Artificial Ground north-south dimension (source：Study Team)

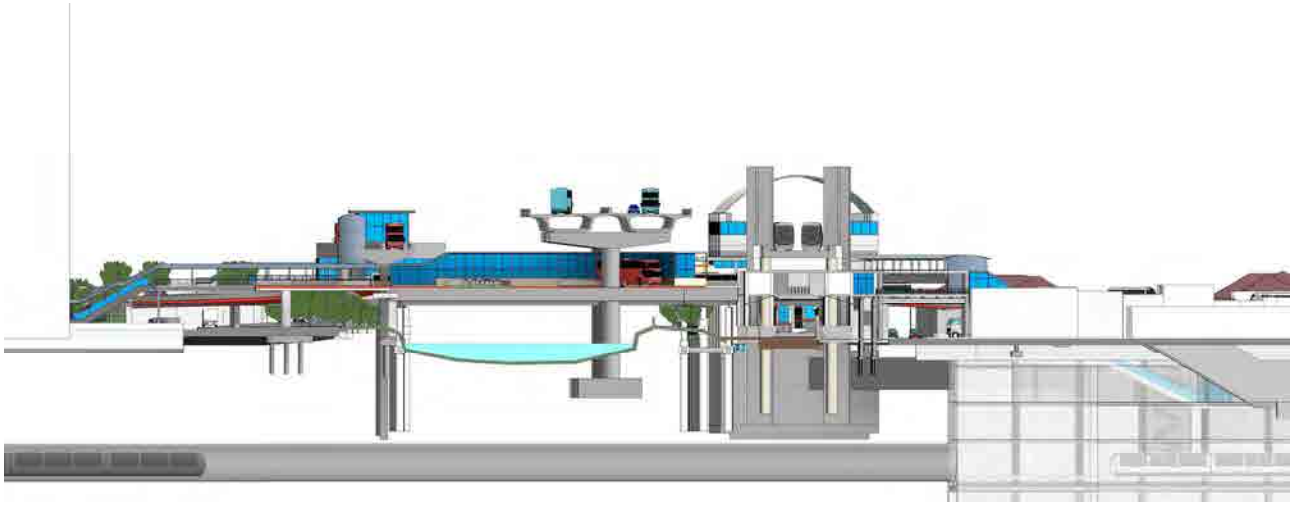


Fig-4.4.39 PHASE2 Artificial Ground north-south dimension (source：Study Team)

Fig-4.4.40 PHASE2 Artificial Ground west side image (source：Study Team)

Fig-4.4.41 PHASE2 Artificial Ground east side image (source：Study Team)

Fig-4.4.42 PHASE2 Artificial Ground west side green area image (source : Study Team)

Fig-4.4.43 PHASE2 Artificial Ground west side traffic terminal image (source : Study Team)

4.5 Construction Planning

4.5.1 Policy for study

This section will discuss the general policy regarding construction planning for this project. As a rule, matters relating to the railway station will be considered outside the scope of the discussion.

1) Overall Plan View

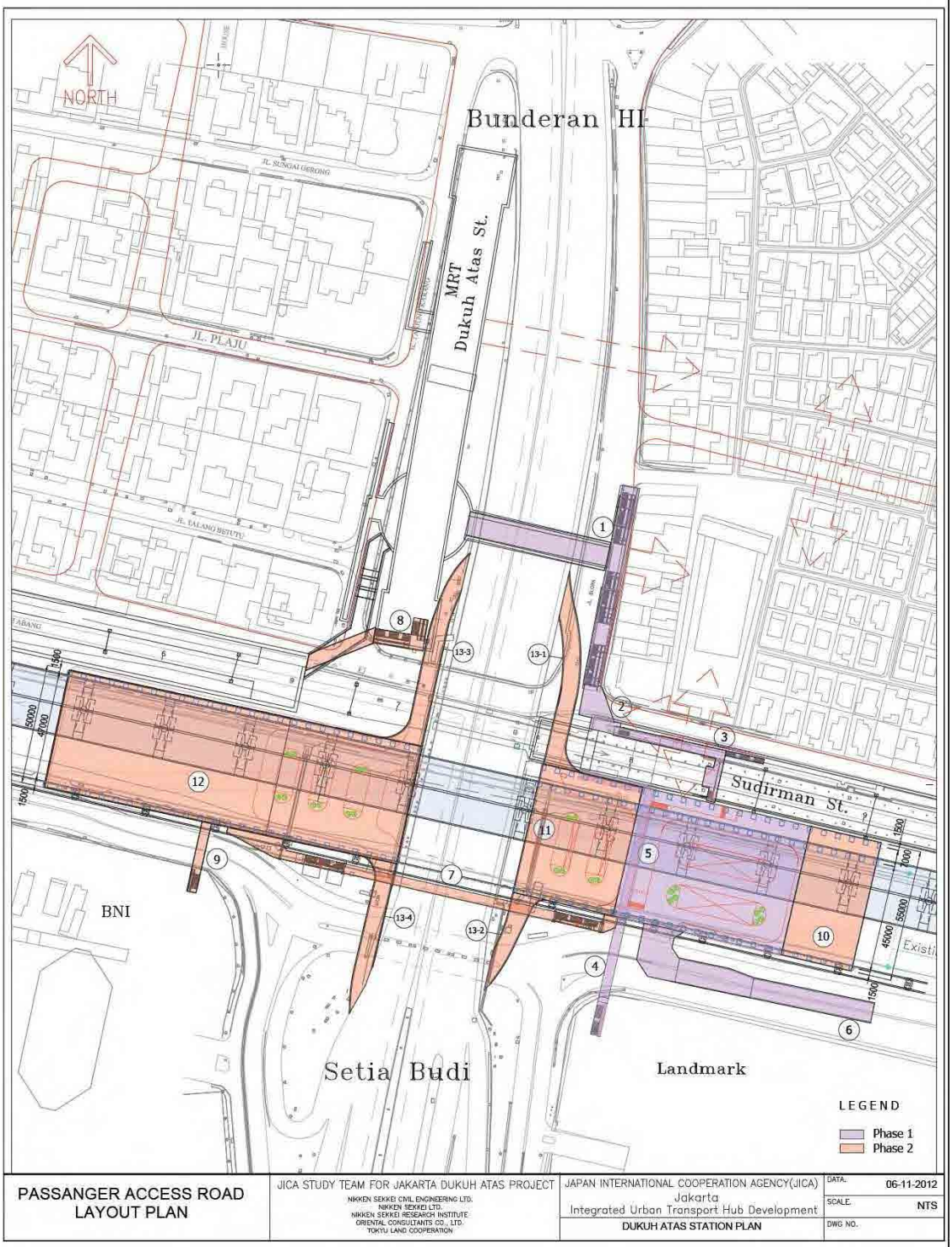


Fig-4.5.1 Overall Plan View (source : Study Team)

2) Conditions for study

- The method must be one that minimizes impact on the surrounding area.
- In construction terms, the method must be safe and commonly used.
- In economic terms, the most advantageous methods must be studied.
- Since the period of construction is after the completion of the MRT J and the construction work is similar, it is assumed that materials and construction machinery can be prepared, and that personnel will have experience with that type of construction.
- References provided by MRT J will be used with regard to soil conditions.
- When the construction will impede ordinary transport, it will be done at night when there is little traffic.
- For construction adjacent to railway lines, the requisite safety measures will be provided.
- It is considered that Japanese design standards will be used.
- As this project can be carried out independently of the construction according to the Phase-1 of Underground Railway North-South Line MRT ongoing, this project will not affect the scope, schedule and bidding procedure of MRT Project.

3) Items for study

- Temporary placement methods and construction methods for underground structures
- With regard to the artificial ground: access roads, construction materials and equipment yard, need for pier, use of park
- Road detours

4) Content of study

(1) Phase-1 Structures

①Study of construction method for underground passageway under Thamrin Street
②Study of passageway on the east side of Thamrin Street
③Study of temporary passageway between Sudirman Stn. and artificial ground, and passageway around Sudirman Stn.
④study of passageway between artificial ground and South/East block
⑤Study of construction method for artificial ground
⑥Study of construction method for BRT access road

(2) Phase-2 Structures

⑦Study of construction method for passageway between East and West artificial ground
⑧Study of construction method for passageway between airport line station and MRT station
⑨Study of construction method for passageway between artificial ground and South/West Block
⑩Study of construction method for artificial ground construction methods (the East End)
⑪Study of artificial ground construction methods (East side of Sudirman Bridge)
⑫Study of artificial ground construction methods (West side of Sudirman Bridge)
⑬Study of Access Road from Thamrin/Sudirman Street to Artificial Ground

4.5.2 PHASE1 Construction Study

1) Conditions for Study

(1) Road names: Thamrin Street, area near Sudirman Station — on bridge

East side of Thamrin Street: Bolar Street
West side of Thamrin Street: Tanjung Karang Street

(2) Road specifications: Thamrin Street, roads in area near Sudirman Station — roads on bridge

(in north direction)	Sidewalk + 3 + 1 (BRT)
(in south direction)	1 (BRT) + 5 + sidewalk
Center	TransJakarta up and down tracks
	Width 4.0 m x 2
Total width	Approximately 40 m

Longitudinal gradient of road on north side I=approximately 3%
Around 2006, east side was widened to approximately 8 m
Pile + slab construction
East side of Thamrin Street:
Bolar Street Width W=16 m One-way traffic in south direction
West side of Thamrin Street: Tanjung Karang Street
Width W=8 m Two-way traffic

(3) Road traffic status

As noted earlier, Thamrin/Sudirman Street is a main road passing north to south through the center of Jakarta, Indonesia. It has an extremely high volume of traffic and is always congested in the morning and evening, and it a “3-in-1” target route.

The other two roads also have a high volume of traffic during the day.

2) Study of Construction Methods

(1) Construction methods for Thamrin Street and Sudirman Street

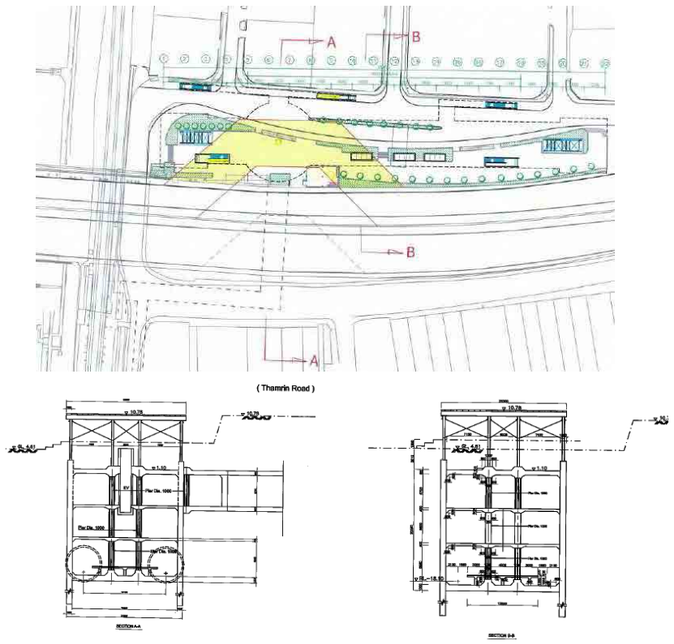
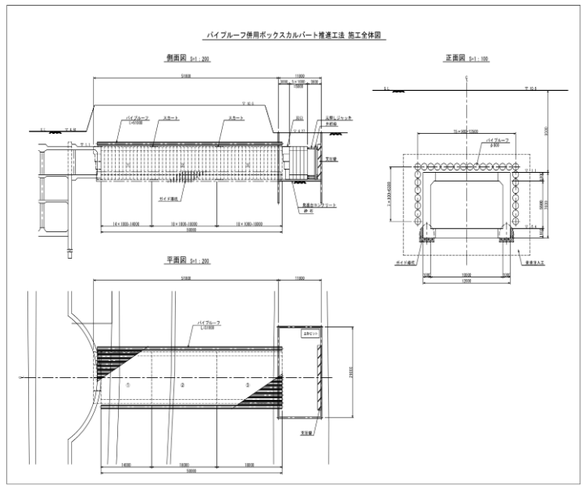
The method used to construct the underground passageways beneath main roads will be the cut-and-cover method and the non-cut-and-cover method. Normally when constructing underground structures beneath roads, normally the road is lined to enable the road surface to be used, and then the cut-and-cover method is used to excavate underground. The non-cut-and-cover method does not impede surface level roads, but construction costs are high and advanced technologies and many processes are required. For this project, three cases will be considered: a) full road surface lining, b) partial temporary support and partial road surface lining, and c) underpass construction.

Jakarta Province is desirous of a method that avoids creating traffic congestion to the greatest extent possible. The following conditions must be met in the course of the study.

- The period of construction will be following the completion of the MRT J Dukuh Atas underground station.
- The width of roads used for temporary detours must be at least as wide as the present roads, 20 meters in each direction
- The support piles for temporary detours will be those placed on the side walls of the underground station and medium columns.
- The roads used for temporary detours will have the road surface lined, and the road gradient will be matched to that of the present roads.

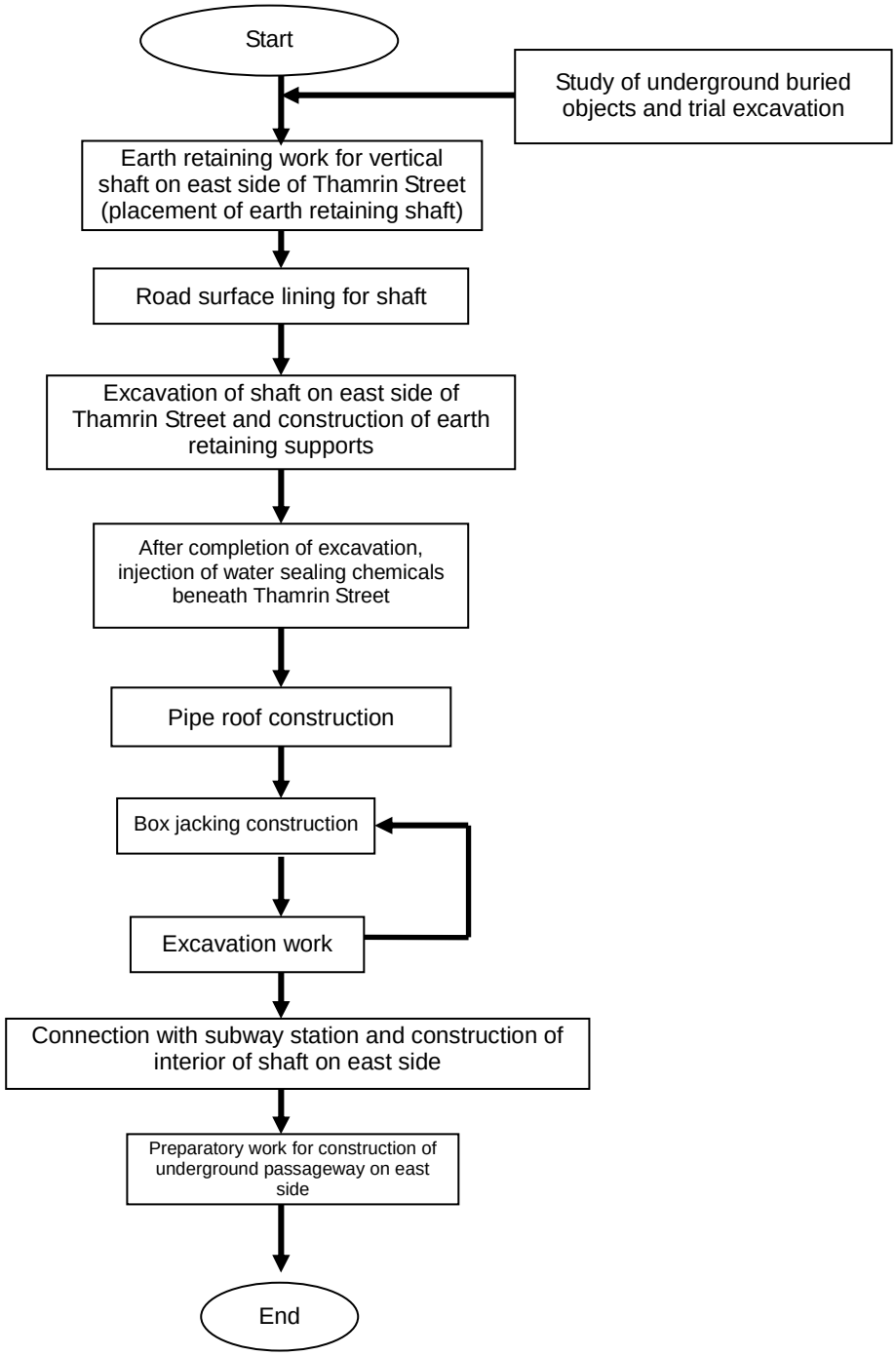
(a) Comparison Study of Construction Methods

Table 4.5.1 Comparative Study of Construction Methods

	Partial temporary support/partitioned road surface lining method	Underpass construction (pipe roof method)	Underpass construction (combined pipe roof and jacking method)
Conceptual diagram			
Features	• As the road is curved, the speed of vehicles is reduced, increasing traffic congestion. • As the construction will start after the subway station has been completed, there is the problem of using the space above the station. • The main structure will be constructed in sections. • There is the problem of what to do about the bottom edge of the lining support piles.	• As the road surface is not used, the work poses no obstacles to traffic. • As the departure shaft will be positioned on Bolar Street on the east side of Thamrin Street, one lane of Bolar Street will be closed to traffic at night. • The construction is difficult and will require a long period of time, and the quality of the main unit structure will be poor. • There are many joints, so leakage water treatment will be needed. • The scope of construction is limited in cross-sectional terms. • This method is disadvantageous in economic terms.	• As the road surface is not used, the work poses no obstacles to traffic. • As the departure shaft will be positioned on Bolar Street on the east side of Thamrin Street, one lane of Bolar Street will be closed to traffic at night. • The main structure is a factory product, so quality is high. • The scope of construction is limited in cross-sectional terms. • This method is disadvantageous in economic terms.
Construction period	21 months	25 months	21 months
Construction costs	1.0 (¥900 million)	1.9 (¥1.7 billion)	2.1 (¥1.9 billion)
Overall assessment	C	B	A

Source: Study Team

(b) Construction Procedure for Underpass Method (combined pipe roof and jacking method)

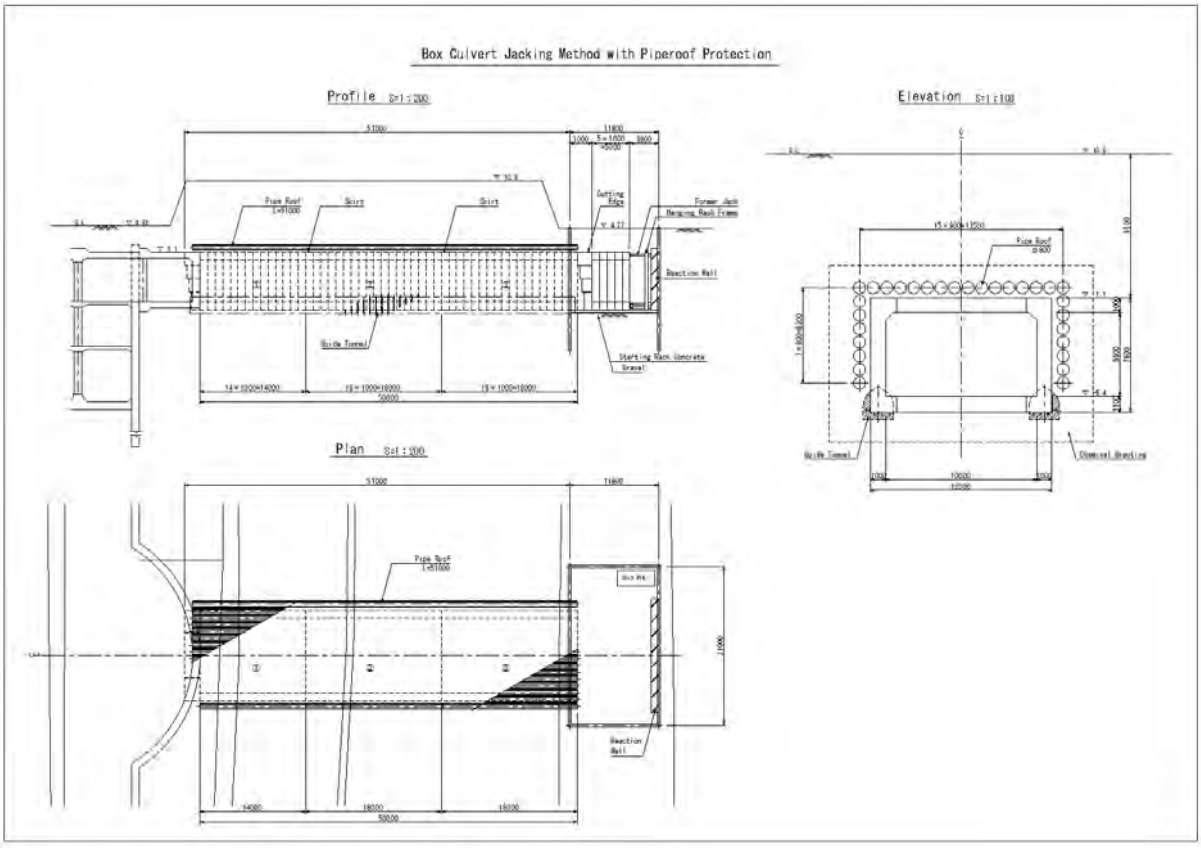


Source: Study Team

Figure. 4.5.2 Construction procedure using combined pipe roof and jacking method beneath Thamrin Street

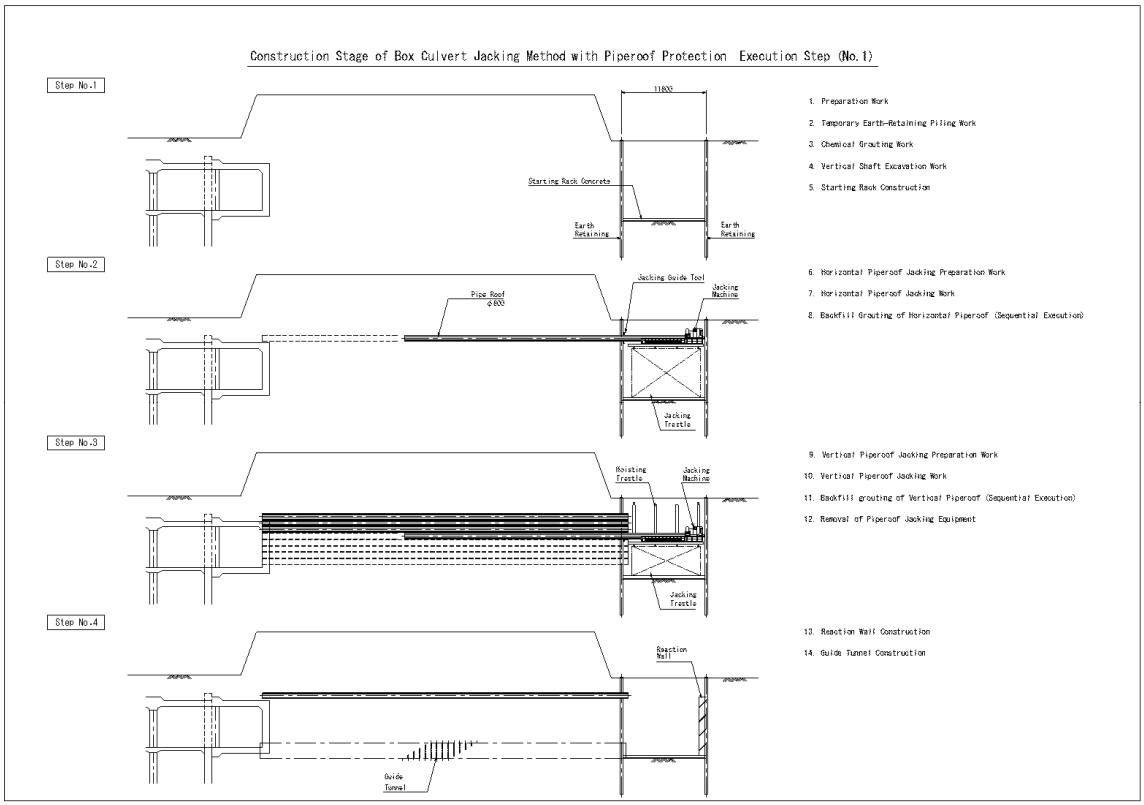
(c) Construction Procedure for Underpass Method

As some of the structures on the east side of Thamrin Street are bridge forms with a pile + slab structure, the need for pipe roof method after-treatment should be studied. In addition, in the case of the pipe roof method, the arrival side will be the subway station side where excavation has not been conducted.



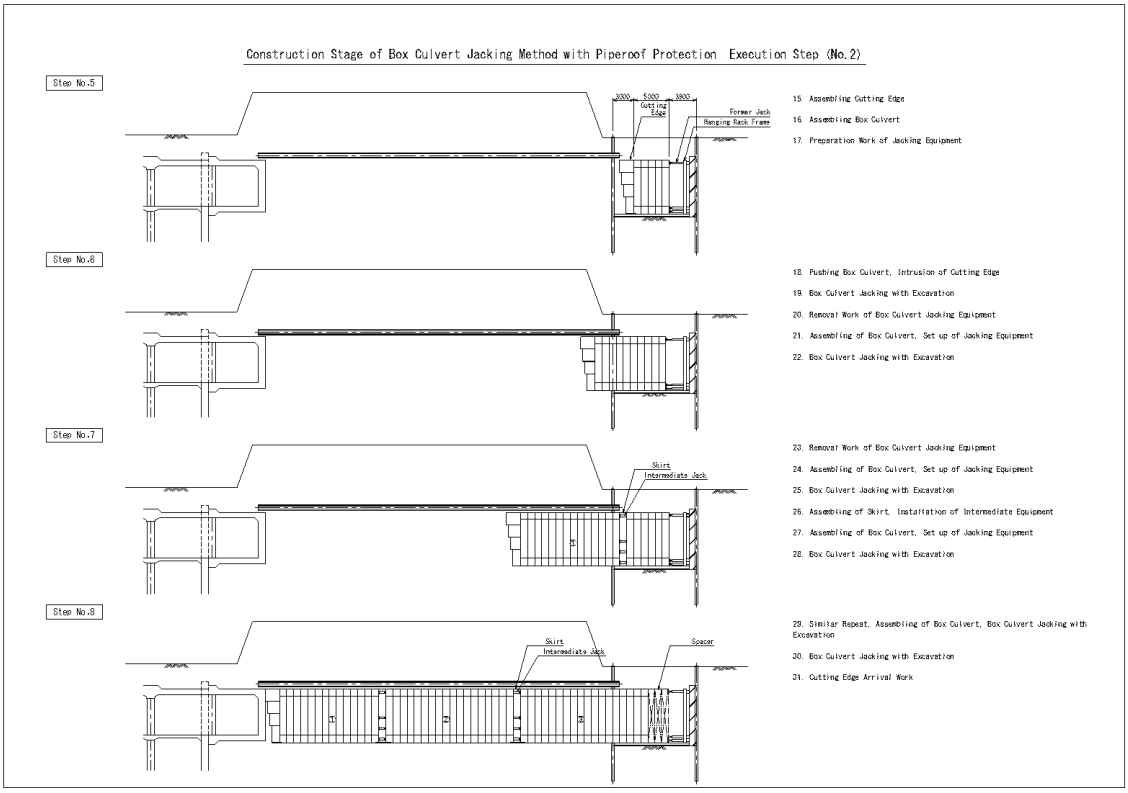
Source: Study Team

Figure. 4.5.3 Construction using Combined Pipe Roof and Box Culvert & Jacking Method



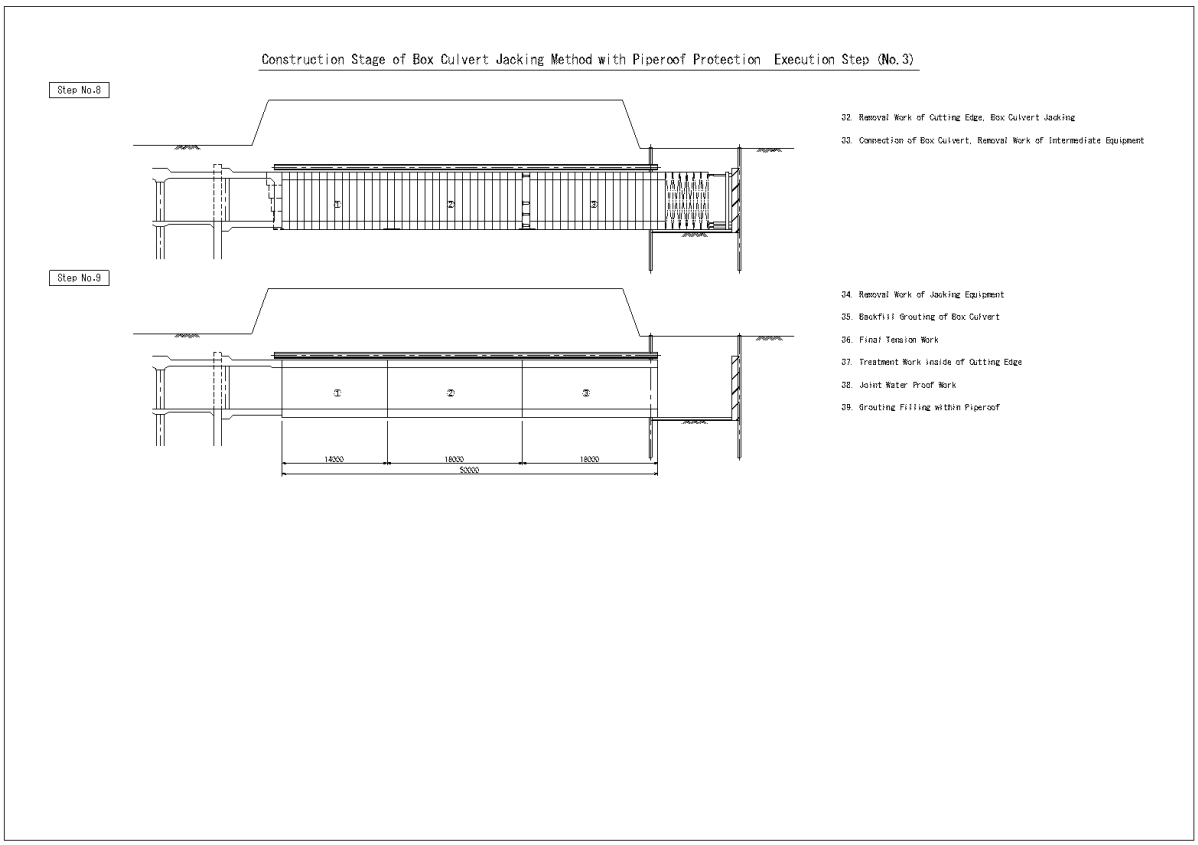
Source: Study Team

Figure. 4.5.4 Construction Procedure using Combined Pipe Roof and Box Culvert & Jacking Method



Source: Study Team

Figure. 4.5.5 Construction Procedure using Combined Pipe Roof and Box Culvert & Jacking Method

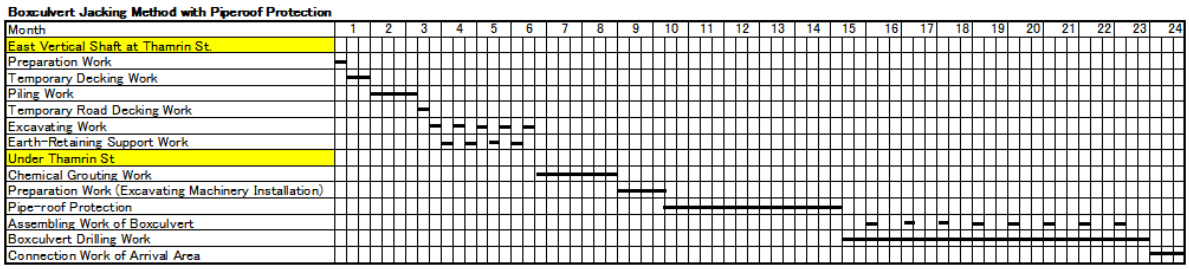


Source: Study Team

Figure. 4.5.6 Construction Procedure using Combined Pipe Roof and Box Culvert & Jacking Method

(d) Implementation Schedule

Table 4.5.2 Pipe Roof Jacking Method Schedule



Source: Study Team

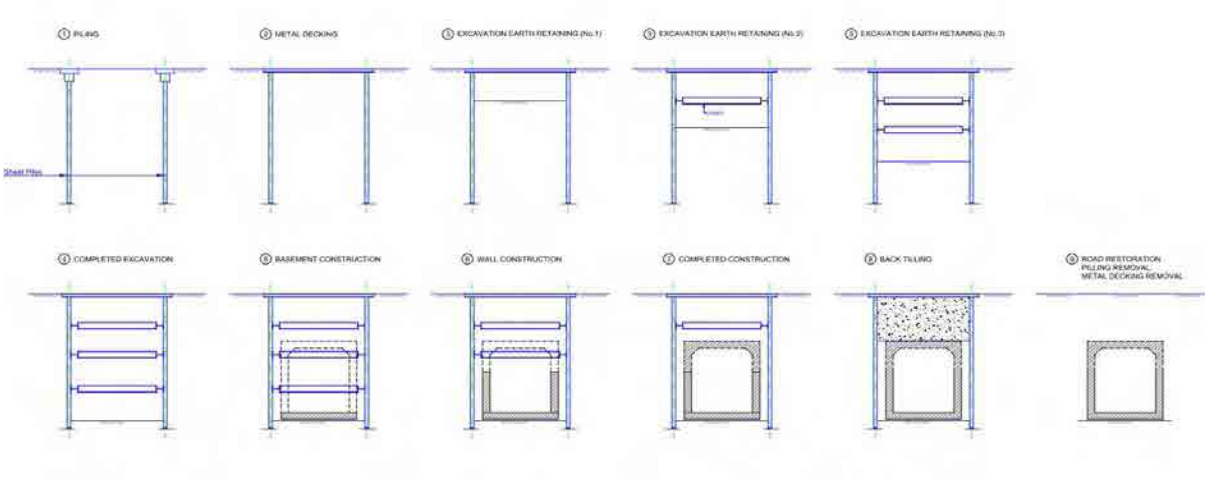
2) Method of Construction on East Side of Thamrin Street

Bolar Street Width=16 m One-way traffic (in south direction)

The underground passageway to be constructed will have an interior width of 8.0 m and a height of 5.5-3.7 m. The excavation depth will be approximately 9.2-11 m. Accordingly, earth bracing will be done using the customary steel sheet piles, after which the road surface will be lined and the passageway will be constructed using the cut-and-cover method. The earth retaining will be done using standard lining with short strut supports. The construction will be done at night when there is little traffic, and the road will be opened to traffic during the day. At night during the construction, traffic will be rerouted.

A press fit method that creates no vibration or noise will be used for construction of the earth retaining piles so there is no impact on the surrounding area from noise, vibration, etc. Drainage will be done by sump pit drainage inside the cut-and-cover section.

The construction method is shown in the Figure below.



Source: Study Team

Figure. 4.5.7 Construction Procedure on East Side of Thamrin Street

3) Study of Underground Passageway Connecting to Existing Railway Sudirman Station

As the area of the existing Sudirman Station is small, connection to the existing Sudirman Station from the MRT underground station via the underground passageway will be done at two connecting points, and people will go up via escalators placed within the railway site between the station and Kendal Street in front of the station. It is considered that the stairs that are currently being used will be moved to a different location.

4) Study of connecting passageway lining east side artificial ground and southeast block

Galunggung Street Width = 20 m Traffic in both east and west directions

Construction will be done by arranging footings and support columns in the central median strip on the road, and considering ease of construction, steel will be used. The passageway will be 4 m wide, and the stairs and escalator will be arranged on privately owned land and will connect to the artificial ground.

The construction method will be the same as that used in the past to construct the BRT pedestrian bridges, etc.

5) Study of East Artificial Ground

As noted earlier, the artificial ground will be constructed over the canal. Both sides of the canal are embankments that are used as sidewalks and parks. As the support piles cannot be placed in the canal, they will be placed within the embankments.

The following section discusses the delivery of construction materials and equipment, the method to be used for construction and so on.

(1) Establishment of scope of construction work

The planned scope of construction for the east side artificial ground is approximately 47 m distant from the east side of the Thamrin/Sudirman Street highway bridge. The area will be 55 m in width and 72 m in length.

(2) Study of construction methods

(a) Access roads, work roads and placement of temporary pier

Support piles will be placed on the embankments on the north and south sides of the canal. On the north side, there is a railroad track between the local road and the embankment, making access to the embankment difficult. Based on these site circumstances, the access road to the embankment in the area of construction will be from a point approximately 300 m to the east from Thamrin Street on the south side of the canal, where there are few level differences with the local road.

At the access location, a temporary pier will be placed in the canal to enable work vehicles to enter from the west and turn around. As there is no access road to the embankment on the north side of the canal, the idea of placing a traverse temporary pier in the canal is being considered. The support piles for the temporary pier will be H-400 and L=18 m (based on the results of the soil survey), and the width of the temporary pier will be B=8.0 m. The temporary pier will be constructed using a vibro hammer.

In addition, temporary use of the sidewalk and greenery areas within the embankments as work roads is being considered.

Source: Study Team

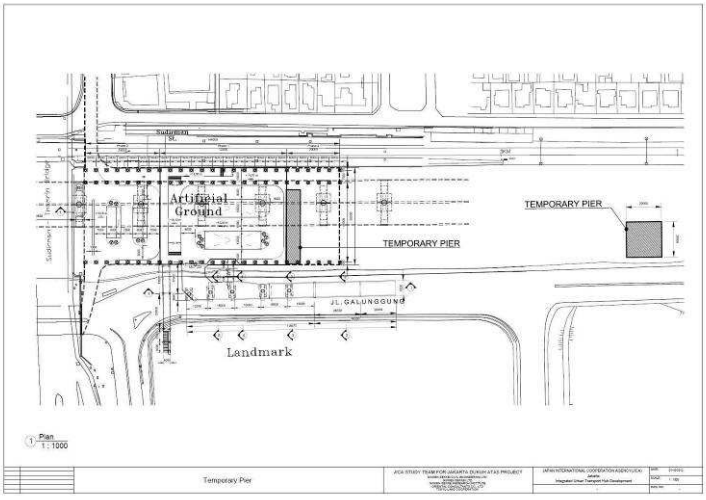
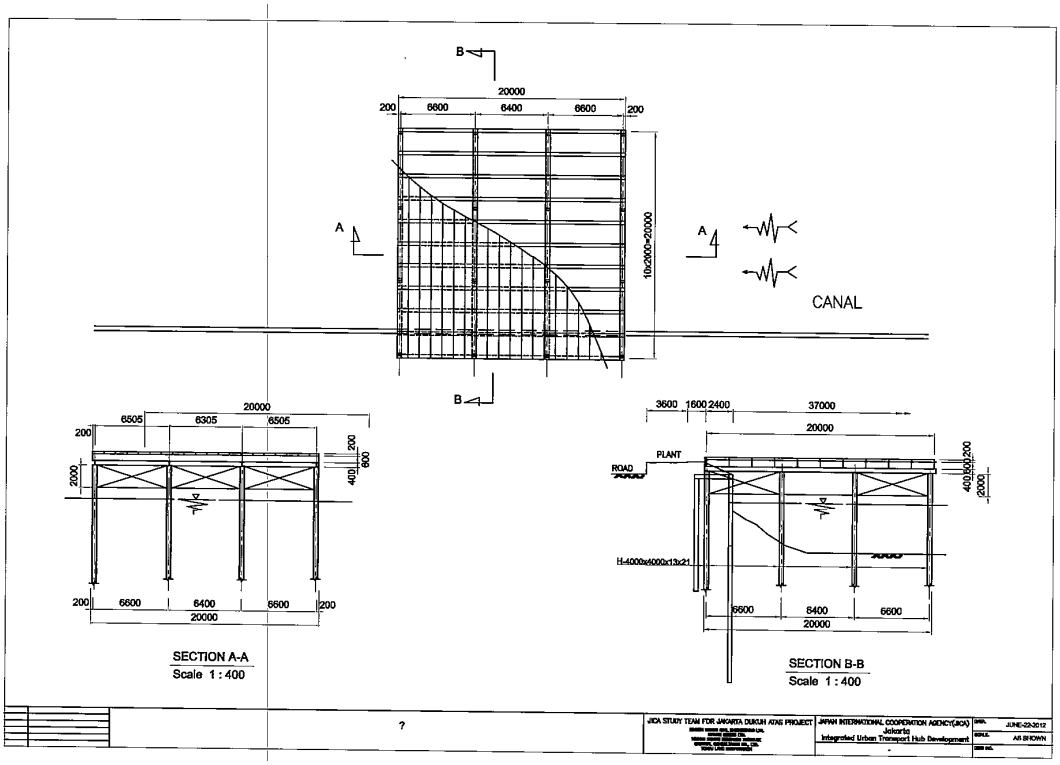
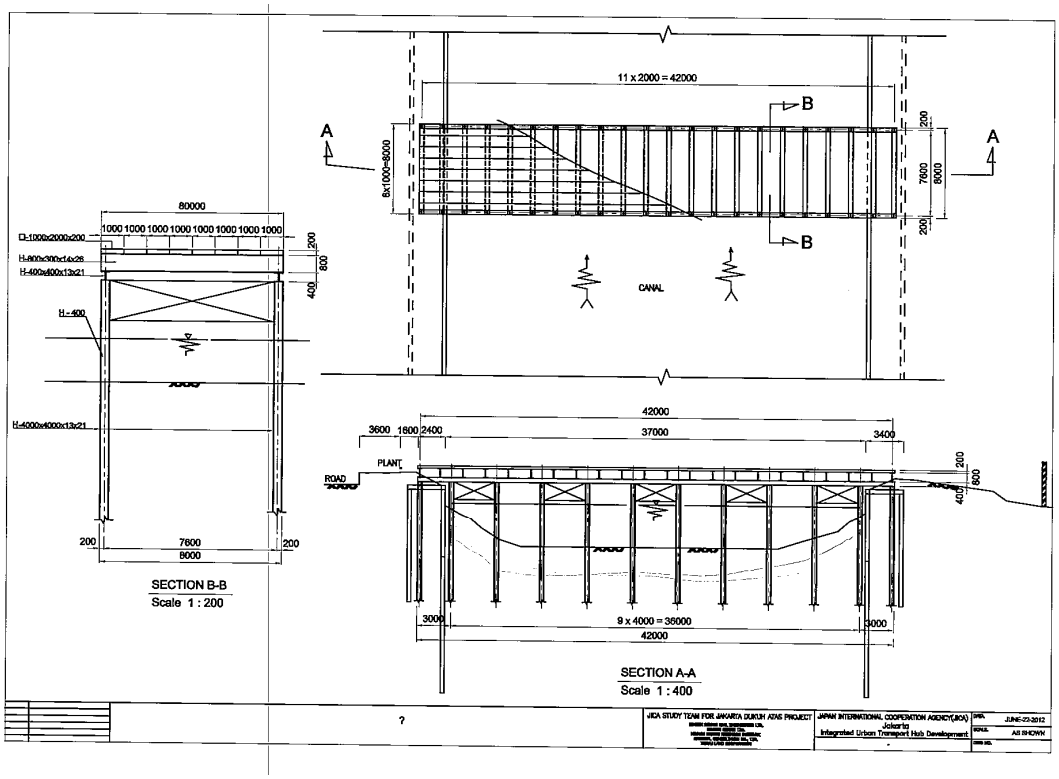


Figure-4.5.8 Temporary Pier Top View



Source: Study Team

Figure. 4.5.9 Temporary Pier Cross-Section (1)



Source: Study Team

Figure. 4.5.10 Temporary Pier Cross-Section (2)

(b) Artificial Ground Construction

① Preparatory work

The use of the greenery sections and pavilion on the embankments as the construction materials and equipment yard for the construction work is being considered. To avoid obstructing traffic, materials will be delivered at night.

② Substructure

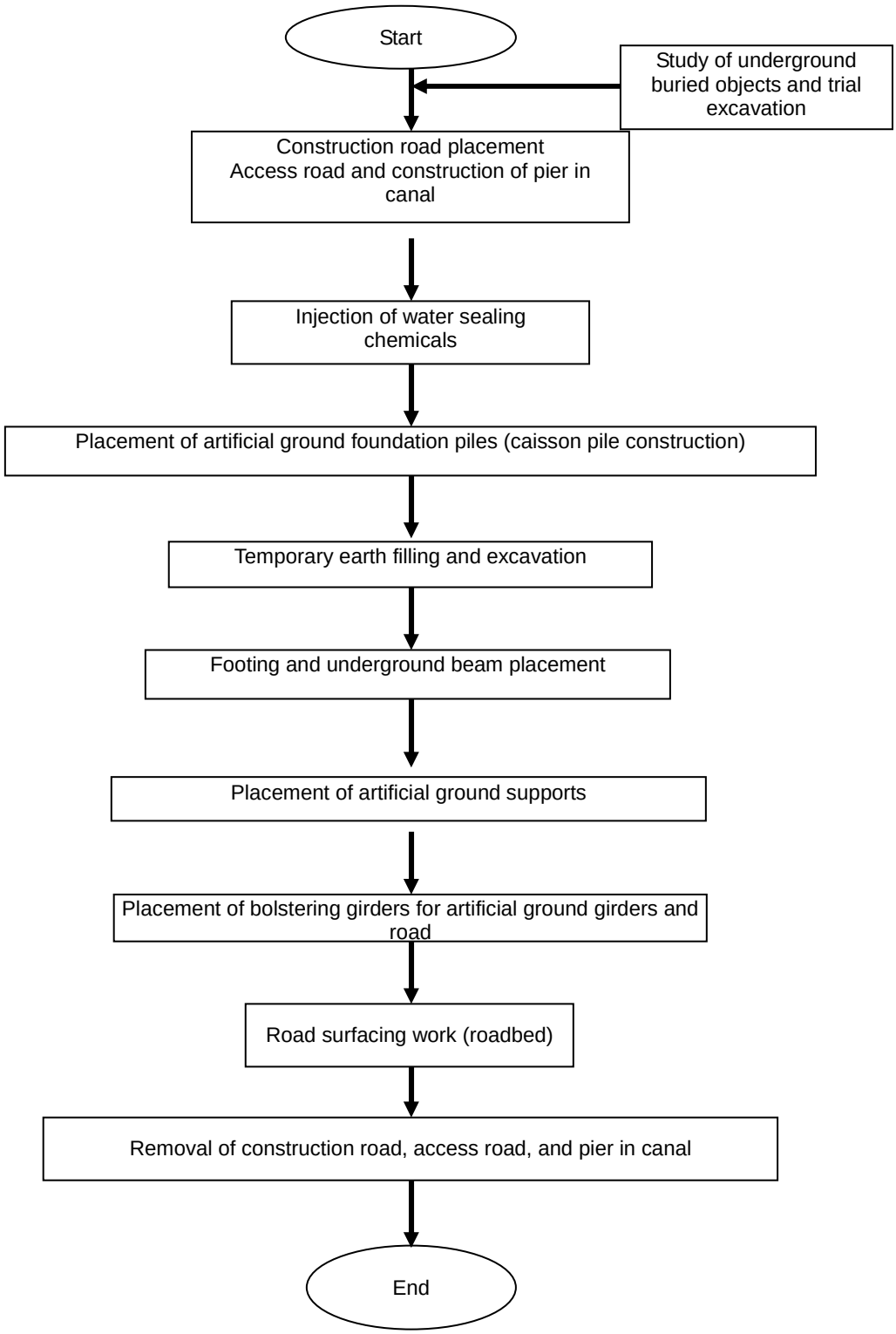
Substructure is constructed with two sets of cast-in-place pile construction machinery towards the East from the Thamrin / Sudirman Street considering the procedure workability. As BH piles are constructed by small drilling machinery, cast-in-place piles are installed in the bank. (BH Pile: rotary drilling pile method (Boring Hole))

③ Superstructure

After the substructure has been completed, the bolstering girders will be put in place. As the bolstering girders are long (length approximately 40 m), they will be transported in sections and connected on the temporary pier that will be provided in the canal. A method is being considered in which two cranes will be used to place them on top of the girder holders, and two winches will be used to slide them to the west. When the bolstering girders have been placed in the proper position, they will be bolted to the girder holders and braces will be put in place between the girders. The bolstering girders will be placed at intervals of 1.5 m.

Methods being considered include a method in which precast concrete is placed on top of the bolstering girders between the girders followed by the placement of concrete slabs, and a method in which deck plates are installed and asphalt pavement is placed on top of these deck plates

(3) Construction Procedure

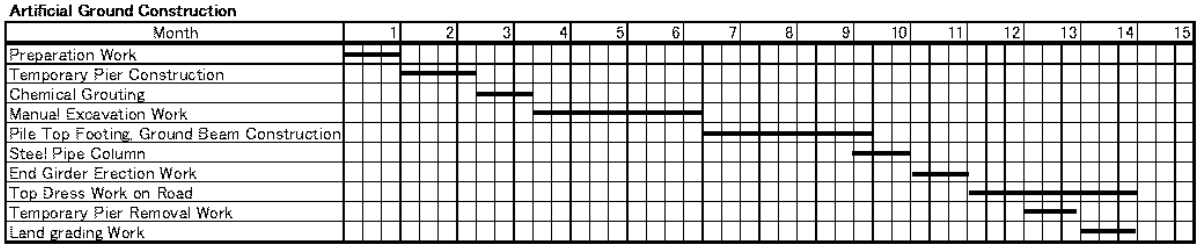


Source: Study Team

Figure. 4.5.11 Construction Procedure for Artificial Ground

(4) Implementation Schedule

Table 4.5.3 Artificial Ground Construction Schedule



Source: Study Team

6) BRT Access Road

As the construction will take place on local roads, the work will be done at night when there is little traffic. A working zone will be placed in the center and traffic will be rerouted before the work begins.

(1) Study of construction methods

(a) Substructure

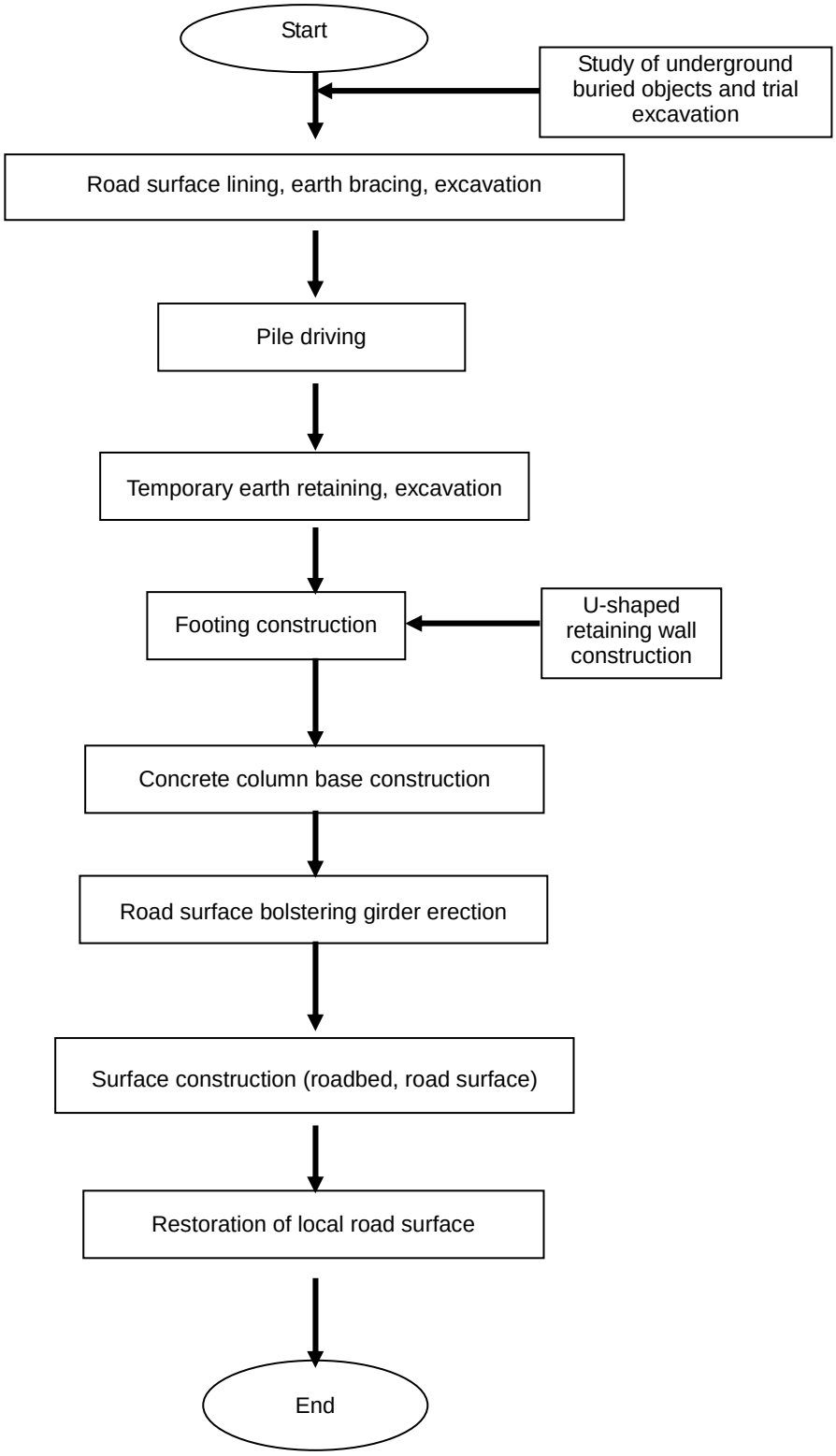
For the foundation position of the access road, earth retaining work, road lining work and excavation will be conducted and precast concrete piles (ø 600 L=10 m) will be driven in. Subsequently, the footing, concrete column bases, U-shaped retaining wall and so on will be constructed.

(b) Superstructure

The bolstering girders for the superstructure are erected in sequence and fastened in place with nine cranes per span, using steel members (H=800 L=15 m) out of consideration for ease of construction. Because this will be a road crossing, an effective height of 5.0 m will be secured for the connection with the artificial ground. Accordingly, factory manufactured grid girders with a girder height of 500 mm will be used and erected through single lift erection at the site.

After the main girders are in place, the concrete deck will be constructed and finished as an asphalt bed. The median strip and side guardrails and so on will then be put in place to complete the access road.

(2) Construction Procedure

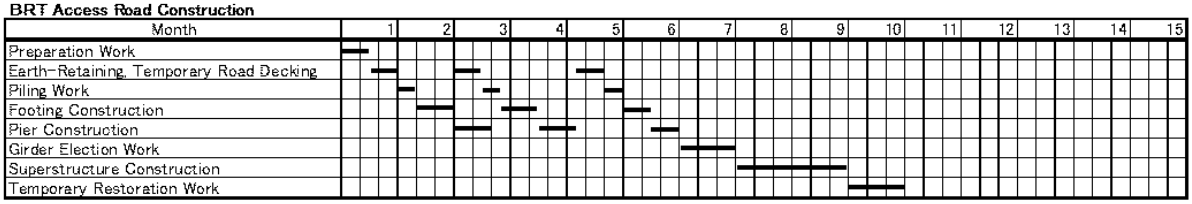


Source: Study Team

Figure. 4.5.12 Procedure for Construction of BRT Access Road for Artificial Ground

(3) Implementation Schedule

Table 4.5.4 BRT Access Road Construction Schedule



Source: Study Team

4.5.3 Construction planning for Phase 2 structures

1) Study for construction of connecting passageway linking east and west artificial grounds

Thamrin/Sudirman Highway Bridge Width = 42.5 m Traffic in both directions

The elevated pedestrian bridges to be constructed will be 4 m wide and will cross above major roads with heavy traffic. Support columns will be arranged on the east and west sides of the road, and the bridges will be constructed with steel that facilitates construction process. For delivery of the main girders to the site, the girders will be separated into lengths of approximately L = 8 m. A work yard will be built at the site on top of the embankment, and the girders will be connected there and then lifted together at night using two cranes. In consideration of the location (major roads) and the need to re-grade the road in the future, an effective height clearance limit of H = 7.0 m or greater, the same as the adjacent monorail, will be secured. The construction equipment and materials will be placed temporarily on the west side embankment.

During the construction, the locations of drainage pumping stations, water pipes and other obstructions will be confirmed and thorough measures will be taken to protect these facilities.

2) Study for construction of a connecting passageway linking the Airport Line and the MRT North-South Line

Tanjung Karang Street Width = 8 m Traffic in both directions

At the time of construction of the connecting passageway, the construction of the underground station for the MRT North-South Line is expected to be complete, and construction of the elevated station for the Airport Line will be in progress. This connecting passageway will extend from the elevated station of the Airport Line and will pass over Tanjung Karang Street at a height of approximately 10 m, with a span of approximately 30 m. The passageway will be of ordinary metal construction and will be 6 m wide and supported by footings and support columns arranged in the park above the underground station. It will be located in the upper section of the subway station, giving consideration to access to the stairs and escalator from the underground station.

3) Study of the construction of a connecting passageway linking the artificial ground on the west side and the southwest block

Karet Pasarbaru Timur Street Width = 14 m Traffic in east and west directions

This connecting passageway will pass over the road, with the footing and support columns arranged in the sidewalk area, and it will be constructed with steel to facilitate construction work. The passageway will be 4 m wide with the stairs and escalator arranged on privately owned land, and it will be connected to the artificial ground. The method of construction will be the same one that has been used up to now to construct pedestrian bridges and the like for BRT facilities.

4) Study for construction of the artificial ground on the eastern end

The construction work will use the artificial ground constructed in Phase 1. Work vehicles will access the artificial ground using the BRT access road. As the BRT will be operating on the artificial ground during the day, the artificial ground can be used only at night when the BRT is not in operation (10:00 p. m. - 5:00 a. m.).

5) Study of construction of artificial ground on east side of highway bridge

Prior to the start of construction, the connecting passageway between the existing Sudirman Station and the artificial ground will be removed to secure room for construction. Station and BRT users will use the connecting passageway that leads from the north side of the station via the east side. As in the case of the east end artificial ground, the construction will use the artificial ground constructed in Phase 1, and the work will be done at night. The procedure for construction will be the same one used for artificial grounds up to that time. The work to connect the artificial ground with Thamrin/Sudiran Street will be done last.

6) Study of construction of west side artificial ground

At present, the work is scheduled to begin in 2017 after the MRT has been completed, and when the construction of the Serpong-Bekasi Line underground station, Airport Line elevated station, Toll Road 6, etc., is in progress. For the construction, work vehicles will enter from the Banjir Kanal south side. Using the same method as in Phase 1, a temporary pier will be constructed in the Banjir Kanal, and bolstering girders will be assembled on top of this pier. The construction procedure will be cast in place piles (ø 1.20 m), footings, column placement, girder supports, bolstering girder placement and surface work.

7) Study of connecting road linking Thramrin/Sudirman Street with artificial ground

Due to the plan to increase the height of the existing highway bridge, the existing highway bridge and the artificial ground will be isolated. This will eliminate the interference between the artificial ground and the essential utilities provided adjacent to the road, and it will also eliminate the need to take into consideration restrictions on the height of the artificial ground. The artificial ground is 1.7-2.3 m higher than the existing road.

Access roads and exit roads of approximately two lanes each will be constructed to connect to the east and west artificial grounds from a total of four locations on the north and south side of the highway bridge. At present, there are no detailed drawings, but the substructure will be constructed with ø600 mm pile supports, footings and bridge piers arranged at approximately 20 m intervals. A superstructure consisting of three prestressed concrete I-girders (girder height 2 m) is being considered. The construction will be proceed so as to not interfere with existing

roads and railways based on the scope of construction.

In addition, the use of retaining walls is planned, as there are slopes in some places.

8) Pending issues

(1) Muddy water during construction

The muddy water, etc., produced during construction will not be allowed to flow directly into the Banjir Kanal. A method is being considered in which a sand basin or the like will be provided to purify the muddy water before it is allowed to flow into the canal. (This will avoid the problem of decreased cross-sectional area of the Banjir Kanal due to abnormal deposition on the canal floor.)

(2) Flood control measures during construction

As a measure to deal with flooding that is expected to occur during the construction period, as a rule, the work inside the Banjir Kanal will be done in the dry season. In the event that this is not possible for scheduling reasons, appropriate safety measures will be devised.

(3) Flood control measures after completion

The plan calls for freeboards that are 50 cm higher than the high water level to be placed on both banks of the Banjir Kanal. The period of implementation is reportedly scheduled to begin soon. The freeboards are made of concrete and are 1.2 meters in height.

(4) Sudirman highway bridge

The existing Sudirman highway bridge was constructed many years ago, and reportedly the passing section of the cross-sectional area of the Banjir Kanal is not compatible with the design flood volume of 500 m3/second. For this reason, the Ministry of Public Works (PU) is planning replacement work in which the height of the bridge road will be increased.

(5) Temporary pier during construction

The construction of a temporary pier for use in the construction is planned. However, the pier piles will reduce the cross-sectional area of the canal. In order to prevent this, a method is being considered in which the bottom of the canal would be dredged on both the upstream and downstream sides, within a large enough area to provide sufficient leeway.

Based on the results of relevant environmental analyses, the earth deposited in the canal is known to contain arsenic and other heavy metals. Accordingly, during the dredging process, it is essential to determine the quantity of earth that is taken in. Initially, however, the heavy metal content in the area to be dredged should be studied, and if the presence of heavy metals is confirmed, measures should be devised to prevent these substances from spreading to the surrounding environment, and the necessary detoxification measures and environmental management measures must be taken.

(6) Toll Road 6

Under the current plan, the bridge piers for Toll Road 6 will be arranged inside the Banjir Kanal. In that case, however, construction after the artificial ground has been completed will be difficult unless at least the foundations of the bridge piers are constructed prior to the artificial

ground construction.

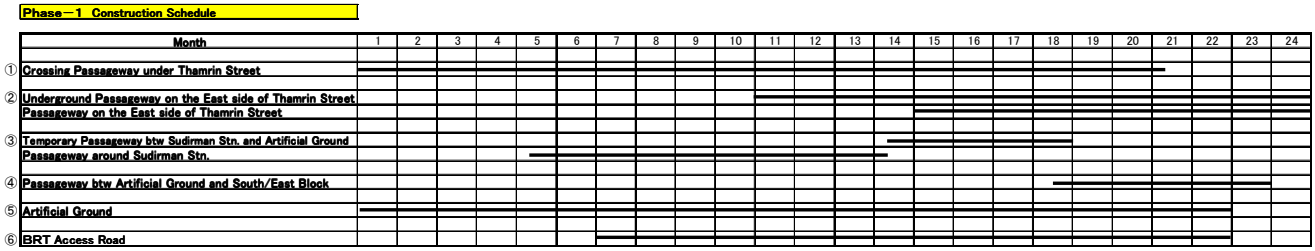
(7) Monorail (or Elevated Busway)

The monorail planned for the south side of the Banjir Kanal should also be constructed prior to the construction of the artificial ground.

4.5.4 Implementation Schedule

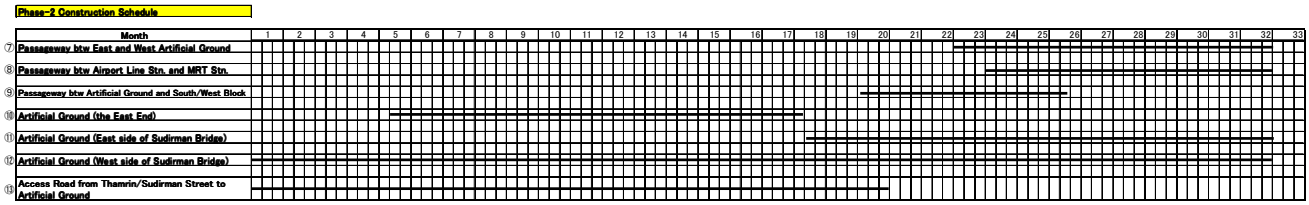
1) Phase-1

Table-4.5.5 Implementation Schedule for Phase 1



2) Phase-2

Table-4.5.6 Implementation Schedule for Phase 2



4.5.5 Study of measures to prevent traffic congestion during construction work

As there has been no particular study of measures taken by the Jakarta city authorities to ease traffic congestion during the construction in the Dukuh Atas Station development, and for the operation of public transport, etc., the following measures will be studied.

1) Basic approach

As has been noted several times, traffic congestion is a serious problem in Jakarta. For this reason, the construction will be done primarily at night to avoid road congestion during the day, and the movement of work vehicles during the day will be avoided to the greatest extent possible. The work hours during which the roads will be used will be 10:00 p. m. - 6:00 a. m.

2) Traffic congestion measures during the construction of each structure

(1) Construction of underground passageway crossing Thamrin Street and underground/above-ground passageways on the east side of Blora Street

To avoid the transit of work vehicles during the day and to ensure rapid promotion of construction work at night, temporary storage of the construction equipment and materials in a yard at the site is planned. The roadside slope on the east side of Thamrin Street will be leveled and converted into a construction equipment and materials yard (approximately 3.0 m x 50 m). This section of Thamrin Street is an elevated bridge with concrete slabs supported by piles, so effective use of the area below is also envisioned.

The shaft used for construction of the underground passageway crossing Thamrin Street will have the road surface covered so the road can be opened to traffic during the day. In addition, the construction of stairs in the above-ground section (the section leading from underground to the ground surface and the section that connects the ground surface with the 2nd floor of the existing Sudirman Station) will use the wide road width of the current Blora Street to create a work zone in the eastern half of the street to allow road traffic to continue to transit normally to ensure that further traffic congestion is not produced as a result of the construction.

Figure.-4.5.13 Blora Street ramp on east side of Thamrin Street and use of Blora Street

(2) Connecting passageway linking east side artificial ground with southeast block

As this construction work involves arranging support columns near the center of the road, a work zone (approximately 1.0 m wide and 2.0 m long) in the center of the road will be needed for a short period of time during the construction process. This is to protect the support columns, and the construction will be conducted simultaneously with that of the nearby BRT access road. Every effort will be made to avoid impeding traffic.

(3) Construction of artificial ground

In the construction of the artificial ground on the east side of Thamrin Street in Phase 1, it will be possible to avoid using the road apart from the delivery and removal of construction equipment and materials, so the plan calls for construction equipment and materials to be delivered at night when the traffic situation is favorable. The entrance for delivery and removal of construction equipment and materials and the temporary storage yard is the location noted in the separate construction plan. A gate will be provided at the entrance and a person will be stationed there to monitor traffic.

In the Phase 2 artificial ground construction, the artificial ground on the east side of Thamrin Street constructed in Phase 1 will be used for construction work at night.

As in Phase 1, a temporary pier will be constructed and used as a construction equipment and

materials yard for the artificial ground on the west side, and a work access road will be provided in order to prevent traffic congestion during the construction.

(4) BRT access road

The plan calls for the substructure for the access road to be placed in the center of the road. For this reason, the road surface will be covered and the excavation work, pile arrangment work, footing construction, etc., will be conducted beneath the road covering and the road will be opened to traffic during the day. During the construction of the bridge piers and superstructure, the access road will consist of one dedicated lane in each direction. At present, elevated highway bridges are under construction in Jakarta, and the work is being promoted with a substructure work zone having been secured. The same method will be used for this work. In order to minimize traffic congestion, consideration is being given to temporarily cutting away the sidewalk on the road leading west on the south side to widen the vehicle road. The road leading east will be reduced from the present three lanes to two lanes, and there are expected to be no problems as the tunnel beneath Sudirman Street on the upstream side has two lanes. Construction equipment and materials will be stored temporarily on the temporary pier built for the construction of the artificial ground and the temporary access road in order to avoid traffic congestion.

(5) Connecting passageways linking Thamrin/Sudirman Street and artificial ground

The plan calls for the construction of connecting passageways linking the existing road with the artificial ground in four locations — north, south, east, and west. These will be constructed in the same manner as the existing elevated highway bridge, from foundation piles, foundation footings, bridge piers and other substructure elements to the superstructure with I-girders. Nevertheless, the connecting road will be on the outside of Thamrin/Sudirman Street, and every effort will be made to avoid using the existing road. The substructure will be entirely outside the existing road, and the superstructure construction will be done at night to avoid any impact on traffic congestion.

(6) Other

For other structures, use of the existing roads will be limited to transport of materials, and in general materials will be transported at night to avoid traffic congestion.

4.6 PRELIMINARY COST ESTIMATE

4.6.1 Demarcation for Preliminary Cost Estimate

Project costs were estimated as construction work costs (including civil engineering work costs, building work costs, etc.) and consulting fees. The unit price for each type of construction work took into consideration realistic and economical construction methods, and the breakdown of costs was divided between local currency and foreign currency based on the possibility of purchasing in Indonesia. Project costs were allocated annually and took into consideration emergency reserves, interest rates during the construction period, commitment charges, etc.

Project costs were estimated separately for Phase 1 and Phase 2.

Table-4.6.1 Phase-1 and Phase-2 Construction Demarcation

Phase-1	①	Crossing Passageway under Thamrin Street	Width=10m, Length=60m
	②	Passageway on the East side of Thamrin Street	Width=6m, Length=101m
	③	Temporary Passageway btw Sudirman Stn. And Artificial Ground (Including The Way Around Sudirman St.)	Width=4m, Length=92m
	④	Passageway btw Artificial Ground and South/East Block	Width=4m, Length=50m
	⑤	Artificial Ground	Width=55m, Length=72m Area=3,960m2
	⑥	BRT Access Road	Width=9m, Length=137m
Phase-2	⑦	Passageway btw Eastside Artificial ground and West side Artificial Ground	Width=4m, Length=133m
	⑧	Passageway btw Airport Line Stn. MRT Stn.	Width=6m, Length=53m
	⑨	Passageway btw Artificial Ground and South/West Block	Width=4m, Length=23m
	⑩	Artificial Ground(the East End)	Width=55m, Length=30m Area=1,650m2
	⑪	Artificial Ground(East side of Sudirman Bridge)	Width=55m, Length=42m Area=2,310m2
	⑫	Artificial Ground(West side of Sudirman Bridge)	Width=50m, Length=150m Area=7,500m2
	⑬	Access Road from Thamrin/Sudirman Street to Artificial Ground	Width=7m, Length=140+120m+50m+85m

Project costs were estimated on the assumption that they would be paid by Public Sector.

4.6.2 Summary of Cost Estimate (Phase-1)

The Project Cost and Construction Cost of Phase-1 were summarized in Table 4.6.2 and Table 4.6.3.

Table-4.6.2 Summary of Project Cost (Phase-1)

為替レート ：1IDR=0.00911JPY

Item		Cost		Equivalent Total Amount	
		Mil.JPY	Mil.IDR	in Mil.JPY	in Mil.IDR
A. ELIGIBLE PORTION					
Ⅰ) Procurement / Construction	a)=c)+d)+e)	2,289	301,887	5,040	553,149
Phase-1	b)=b1 to b8	2,029	227,022	4,098	449,745
Crossing Passageway under Thamrin Street	b1	738	132,051	1,941	213,061
Undreground Passageway on The East side of Thamrin Street	b2	1	354	4	464
Passageway on The East side of Thamrin Street	b3	121	5,759	174	19,041
Temporary Passageway btw Sudirman Stn. And Artificial Ground	b4	8	1,547	22	2,425
Passegeway around Sudirman St.	b5	23	4,261	62	6,786
Passageway btw Artificial Ground and South/East Block	b6	49	3,971	85	9,350
Artificial Ground	b7	1,003	68,552	1,628	178,651
BRT Access Road	b8	86	10,527	182	19,967
Base cost for JICA financing	c)=b)	2,029	227,022	4,098	449,744
Price escalation	d)	151	60,489	702	77,064
Physical contingency	e)	109	14,376	240	26,341
Ⅱ) Consulting services	f)=f1 to f3	357	26,022	594	65,210
Base cost	f1	323	20,872	513	56,328
Price escalation	f2	17	3,910	53	5,776
Physical contingency	f3	17	1,239	28	3,105
Total (Ⅰ + Ⅱ)	g)=a)+f)	2,647	327,908	5,634	618,468

B. NON ELIGIBLE PORTION					
a Procurement / Construction		0	0	0	0
Base cost for JICA financing		0	0	0	0
Price escalation		0	0	0	0
Physical contingency		0	0	0	0
b Land Acquisition		0	0	0	0
Base cost		0	0	0	0
Price escalation		0	0	0	0
Physical contingency		0	0	0	0
c Administration cost	h)	0	6,185	56	6,185
d VAT	i)	0	32,791	299	32,791
e Import Tax	j)	0	0	0	0
Total (a+b+c+d+e)	k)=h)+i)+j)	0	38,975	355	38,975
TOTAL (A+B)	l)=g)+k)	2,647	366,884	5,989	657,444
C. Interest during Construction	m)=m1+m2	93	0	93	10,209
Interest during Construction(Const.)	m1	93	0	93	10,209
Interest during Construction (Consul.)	m2	0	0	0	0
D. Commitment Charge	n)	17	0	17	1,866
GRAND TOTAL (A+B+C+D)	o)=l)+m)+m)	2,757	366,884	6,100	669,518
E. JICA finance portion incl. IDC (A + C + D)	p)=g)+m)+n)	2,757	327,908	5,744	630,542

Table-4.6.3 Summary of Construction Cost (Phase-1)

item	unit	Quantity	Unit Price		Cost		Total
			Foreign	Local	Foreign	Local	
			yen	Rp	yen	Rp	yen
Phase-1							
① Crossing Passageway under Thamrin Street							
Slope Area Construction	LS	1	119,309,660	3,503,481,000	119,309,660	3,503,481,000	151,226,372
Piperoof Jacking Work/Subsidiary Work	LS	1	3,375,080	2,285,470,000	3,375,080	2,285,470,000	24,195,712
Piperoof Jacking Work/Shaft Work	LS	1	23,015,080	3,020,840,000	23,015,080	3,020,840,000	50,534,932
Piperoof Jacking Work/Chemical Grouting	m3	3583.1	39,790	8,332,000	142,571,549	29,854,389,200	414,545,035
Piperoof Jacking Work/Box Culvert Work	LS	1	48,244,000	25,158,025,000	48,244,000	25,158,025,000	277,433,608
Piperoof Jacking Work/Pipe Roof Work	LS	1	37,079,800	32,191,335,000	37,079,800	32,191,335,000	330,342,862
Piperoof Jacking Work/Box Culvert Jackinng Work	LS	1	353,486,691	31,016,187,600	353,486,691	31,016,187,600	636,044,160
Piperoof Jacking Work/Joint Waterproofing	LS	1	4,236,600	1,551,694,000	4,236,600	1,551,694,000	18,372,532
Facilities	LS	1	6,654,530	3,470,071,000	6,654,530	3,470,071,000	38,266,877
Sub Total					737,972,990	132,051,492,800	1,940,962,089
②-1 Undreground Passageway on The East side of Thamrin Street							
Stairs Work	LS	1	531,300	222,173,000	531,300	222,173,000	2,555,296
Station Reconstruction Work	LS	1	63,760	132,193,000	63,760	132,193,000	1,268,038
Sub Total					595,060	354,366,000	3,823,334
②-2 Passageway on The East side of Thamrin Street							
Steel Structure Work	t	45.4	39,930	20,820,000	1,812,822	945,228,000	10,423,849
ESC(B=1,000mm Rise6,000mm)	Set	2	6,442,010	20,829,000	12,884,020	41,658,000	13,263,524
Surface Work	m2	170	700	1,453,000	119,000	247,010,000	2,369,261
Surface Asfalt Work	m2	170	2,620	549,000	445,400	93,330,000	1,295,636
Roof and Steel Fence	m2	558	189,670	7,943,000	105,835,860	4,432,194,000	146,213,147
Total					121,097,102	5,759,420,000	173,565,418
③-1 Temporary Passageway btw Sudirman Stn. And Artificial Ground							
Steel Structure Work	t	30.5	39,930.0	20,820,000	1,217,865	635,010,000	7,002,806
Surface Work	m2	142	700	1,453,000	71,400	148,206,000	1,421,557
Surface Asfalt Work	m2	142	2,620	549,000	267,240	55,998,000	777,382
Roof and Steel Fence(temporary)	m2	142	66,410	6,943,000	6,773,820	708,186,000	13,225,394
Sub Total					8,330,325	1,547,400,000	22,427,139

③-2 Passegeway around Sudirman St.							
Steel Structure Work	t	58	39,930	20,820,000	2,315,940	1,207,560,000	13,316,812
Surface Work	m2	296	700	1,453,000	207,200	430,088,000	4,125,302
Surface Asfalt Work	m2	296	2,620	549,000	775,520	162,504,000	2,255,931
Roof and Steel Fance	m2	296	66,410	6,943,000	19,657,360	2,055,128,000	38,379,576
Piles(□-200×200)	m	468	250	523,000	117,000	244,764,000	2,346,800
Pile Head Footing	m3	27	5,570	2,327,000	150,390	62,829,000	722,762
Excavation(Including Disposal)	m3	165	950	593,000	156,750	97,845,000	1,048,118
Sub Total					23,380,160	4,260,718,000	62,195,301
④ Passageway btw Artificial Ground and South/East Block							
Steel Structure Work	t	90	39,930	20,820,000	3,593,700	1,873,800,000	20,664,018
Base Concrete Work	m3	38	5,570	2,327,000	213,331	89,124,100	1,025,252
ESC(B=1,000mm Rise6,000mm)	Set	1	6,382,240	27,077,000	6,382,240	27,077,000	6,628,911
Surface Work	m2	203	700	1,453,000	142,100	294,959,000	2,829,176
Surface Asfalt Work	m2	203	2,620	549,000	531,860	111,447,000	1,547,142
Roof and Steel Fance	m2	203	189,670	7,943,000	38,503,010	1,612,429,000	53,192,238
Sub Total					49,366,241	4,008,836,100	85,886,738
⑤ Artificial Ground							
Subsidiary Work	LS	1	5,229,720	3,714,480,000	5,229,720	3,714,480,000	39,068,633
Substructure Work	LS	1	32,542,537	4,472,351,500	32,542,537	4,472,351,500	73,285,659
Superstructure Work	LS	1	965,566,800	60,364,810,000	965,566,800	60,364,810,000	1,515,490,219
Sub Total					1,003,339,057	68,551,641,500	1,627,844,511
⑥ BRT Access Road							
Subsidiary Work	LS	1	531,300	222,173,000	531,300	222,173,000	2,555,296
Substructure Work	LS	1	6,120,450	2,747,595,000	6,120,450	2,747,595,000	31,151,040
Superstructure Work	LS	1	79,195,280	7,556,835,000	79,195,280	7,556,835,000	148,038,047
Sub Total					85,847,030	10,526,603,000	181,744,383
Total Phase-1					2,029,927,965	227,060,477,400	4,098,448,914

4.6.3 Summary of Cost Estimate (Phase-2)

The Project Cost and Construction Cost of Phase-2 were summarized in Table 4.6.4 and Table4.6.5.

Table-4.6.4 Summary of Project Cost (Phase-2)

為替レート ：1IDR=0.00911JPY

Item		Cost		Equivalent Total Amount	
		Mil.JPY	Mil.IDR	in Mil.JPY	in Mil.IDR
A. ELIGIBLE PORTION					
Ⅰ) Procurement / Construction	a)=c)+d)+e)	160	10,425	255	27,988
Phase-2	b)=b1 to b7	3,064	218,301	5,053	554,633
Passageway btw East and West Artificial Ground	b1	160	10,425	255	27,988
Passageway btw Airport Line Stn. and MRT Stn.	b2	102	6,924	165	18,120
Passageway btw Artificial Ground and South/West Block	b3	34	2,999	61	6,731
Artificial Ground(the East End)	b4	417	25,088	646	70,862
Artificial Ground(East of Sudirman Bridge)	b5	584	35,124	904	99,229
Artificial Ground(West of Sudirman Bridge)	b6	1,543	103,717	2,488	273,091
Access Road from Thamrin/Sudirman Street to Artificial Ground	b7	224	34,024	534	58,612
Base cost for JICA financing	c)=b)	3,065	218,301	5,053	554,744
Price escalation	d)	418	113,567	1,452	159,451
Physical contingency	e)	174	16,593	325	35,693
Ⅱ) Consulting services	f)=f1 to f3	174	14,334	305	33,434
Base cost	f1	146	8,941	227	24,967
Price escalation	f2	20	4,710	63	6,905
Physical contingency	f3	8	683	15	1,561
Total (Ⅰ + Ⅱ)	g)=a)+f)	3,830	362,796	7,135	783,213

B. NON ELIGIBLE PORTION					
a Procurement / Construction		0	0	0	0
Base cost for JICA financing		0	0	0	0
Price escalation		0	0	0	0
Physical contingency		0	0	0	0
b Land Acquisition		0	0	0	0
Base cost		0	0	0	0
Price escalation		0	0	0	0
Physical contingency		0	0	0	0
c Administration cost	h)	0	7,832	71	7,832
d VAT	i)	0	36,280	331	36,280
e Import Tax	j)	0	0	0	0
Total (a+b+c+d+e)	k)=h)+i)+j)	0	44,112	402	44,112
TOTAL (A+B)	l)=g)+k)	3,830	406,908	7,537	827,325
C. Interest during Construction	m)=m1+m2	155	0	155	17,014
Interest during Construction(Const.)	m1	155	0	155	17,014
Interest during Construction (Consul.)	m2	0	0	0	0
D. Commitment Charge	n)	22	0	22	2,415
GRAND TOTAL (A+B+C+D)	o)=l)+m)+m)	4,007	406,908	7,714	846,754
E. JICA finance portion incl. IDC (A + C + D)	p)=g)+m)+n)	4,007	362,796	7,312	802,642

Table-4.6.5 Summary of Construction Cost (Phase-2)

item	unit	Quantity	Unit Price		Cost		Total
			Foreign	Local	Foreign	Local	
			yen	Rp	yen	Rp	yen
Phase-2							
⑦ Passageway btw East and West Artificial Ground							
Steel Structure Work	t	260	39,930	20,820,000	10,381,800	5,413,200,000	59,696,052
Base Concrete Work	m3	30	5,570	2,327,000	167,100	69,810,000	803,069
ESC(B=1,000mm Rise9,000mm	Set	2	26,325,920	24,995,000	52,651,840	49,990,000	53,107,249
SurfaceConcrete Work	m2	460	700	1,453,000	322,000	668,380,000	6,410,942
Surface Work	m2	460	2,620	549,000	1,205,200	252,540,000	3,505,839
Roof and Steel Fence	m2	500	189,670	7,943,000	94,835,000	3,971,500,000	131,015,365
Sub Total					159,562,940	10,425,420,000	254,538,516
⑧ Passageway btw Airport Line Stn. MRT Stn.							
Steel Structure Work 1	t	130	39,930	20,820,000	5,190,900	2,706,600,000	29,848,026
Surface Work 1	m2	151	2,760	578,000	416,760	87,278,000	1,211,863
Roof and Steel Fence 1	m2	181	189,670	7,943,000	34,330,270	1,437,683,000	47,427,562
Steel Structure Work 2	t	33	39,930	20,820,000	1,317,690	687,060,000	7,576,807
ESC(B=1,000mm Rise6,000mm)	Set	2	6,442,010	20,829,000	12,884,020	41,658,000	13,263,524
ESC(B=1,000mm Rise3,000mm)	Set	2	5,744,020	24,370,000	11,488,040	48,740,000	11,932,061
SurfaceConcrete Work 2	m3	104	700	1,453,000	72,800	151,112,000	1,449,430
Surface Work 2	m2	104	2,760	578,000	287,040	60,112,000	834,660
Roof and Steel Fence 2	m2	186	189,670	7,943,000	35,278,620	1,477,398,000	48,737,716
Excavation(Including Disposal)	m3	224	950	593,000	212,800	132,832,000	1,422,900
Base Concrete Work	m3	40	5,570	2,327,000	222,800	93,080,000	1,070,759
Sub Total					101,701,740	6,923,553,000	164,775,308
⑨ Passageway btw Artificial Ground and South/West Block							
Steel Structure Work	t	90	39,930	20,820,000	3,593,700	1,873,800,000	20,664,018
ESC(B=1,000mm Rise3,000mm)	Set	1	5,744,020	24,370,000	5,744,020	24,370,000	5,966,031
Surface Work	m2	100	2,760	578,000	276,000	57,800,000	802,558
Roof and Steel Fence	m2	129	189,670	7,943,000	24,467,430	1,024,647,000	33,801,964
Base Concrete Work	m3	8	5,570	2,327,000	44,560	18,616,000	214,152
Sub Total					34,125,710	2,999,233,000	61,448,723

⑩ Artificial Ground(the East End)							
Artificial Ground	m2	1,650	253,030	15,205,000	417,499,500	25,088,250,000	646,053,458
Sub Total					417,499,500	25,088,250,000	646,053,458
⑪ Artificial Ground(East of Sudirman Bridge)							
Artificial Ground	m2	2,310	253,030	15,205,000	584,499,300	35,123,550,000	904,474,841
Sub Total					584,499,300	35,123,550,000	904,474,841
⑫ Artificial Ground(West of Sudirman Bridge)							
Subsidiary Work	LS	1	5,161,580	3,487,290,000	5,161,580	3,487,290,000	36,930,792
Substructure Work	LS	1	42,727,190	5,702,852,000	42,727,190	5,702,852,000	94,680,172
Superstructure Work	LS	1	1,495,323,650	94,527,307,000	1,495,323,650	94,527,307,000	2,356,467,417
Sub Total					1,543,212,420	103,717,449,000	2,488,078,380
⑬Access Road from Thamrin/Sudirman Street to Artificial Ground							
Temporary Work Road	LS	1	379,880	238,008,000	379,880	238,008,000	2,548,133
PHC-Piles(φ600)	m	1,530	3,950	827,000	6,043,500	1,265,310,000	17,570,474
Excavation(Including Disposal)	m3	1,530	1,770	924,000	2,708,100	1,413,720,000	15,587,089
Footing,Beam Concrete	m3	1,428	4,650	2,423,000	6,640,200	3,460,044,000	38,161,201
Engineering Retaining Wall	m	550	5,440	5,678,000	2,992,000	3,122,900,000	31,441,619
PC Hollow Girder Bridge	m2	2,185	42,510	2,219,000	92,884,350	4,848,515,000	137,054,322
Surface Concrete Work	m3	2,185	700	1,453,000	1,529,500	3,174,805,000	30,451,974
Surface Asfalt Work	m2	2,185	2,620	549,000	5,724,700	1,199,565,000	16,652,737
Road Pavenent	m2	7,363	2,900	608,000	21,352,700	4,476,704,000	62,135,473
Car Guard Fence	m	910	3,830	7,932,000	3,485,300	7,218,120,000	69,242,373
Other Facilities of The Bridge	m2	2,185	35,690	1,121,000	77,982,650	2,449,385,000	100,296,547
Drainage facilities	LS	1	2,218,180	1,156,690,000	2,218,180	1,156,690,000	12,755,626
Sub Total					223,941,060	34,023,766,000	533,897,568
Total Phase-2					3,064,542,670	218,301,221,000	5,053,266,793

4.6.4 Basis and Conditions for Preliminary Cost Estimate

The basis and conditions for Preliminary Cost estimate are shown as follows,

1) Basis and Conditions for Preliminary Cost Estimate

(1) Base Year & Month for Cost Estimate

Sep.2012

(2) Exchange Rate

Sep. 2012

1JPY＝109.77IDR

1IDR＝0.00911JPY

1USD=82.4JPY=9,048IDR

(3) Price Escalation Rate:

Foreign Currency Component(FCC), Japanese Yen : 2.10％

Local Currency Component(LCC), Indonesia Rupiah : 7.10％

(4) Physical Contingency

Construction : 5.0%

Consultant : 5.0％

(5) Interest during Construction（※ Public: In case of ODA Loan）

Public Construction : 1.40％

Consultant : 0.01％

The principal is added the equivalent amount of interest that have assumed to be borrowed.

(6) Tax and VAT

10% for Local Currency Component (LCC)

(7) Rate of Commitment Charges（※ In case of ODA Loan）

0.1％ per year

(8) Administration Cost

5.0% for Local Currency Component (LCC)

(9) Land Acquisition Cost

For cost of land acquisition, there is no land acquisition by adopting the right conversion method to be described later.

4.6.5 Construction Cost

1) Composition of Construction Cost

The Construction Cost consists of the items in Figure. 4.6.1 and Figure. 4.6.2

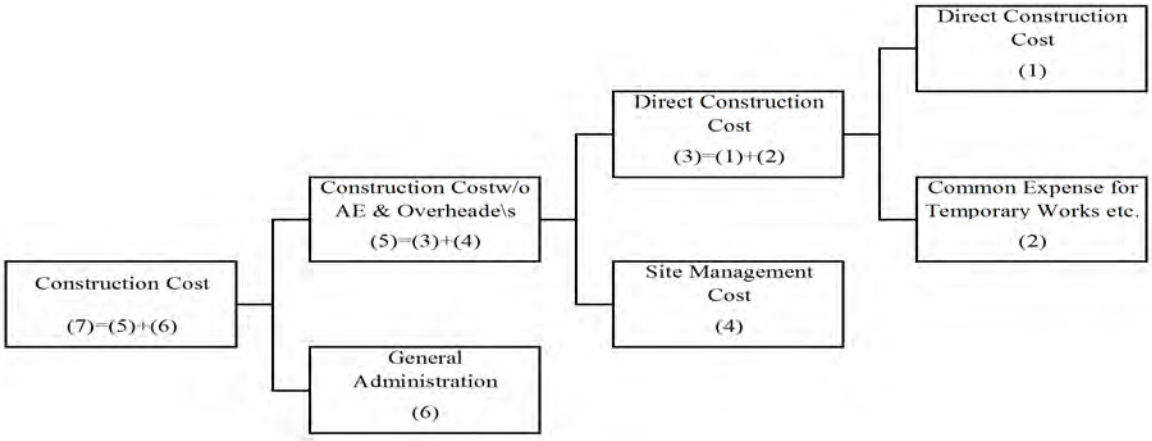


Figure-4.6.1 Components of Construction Cost（1/2）

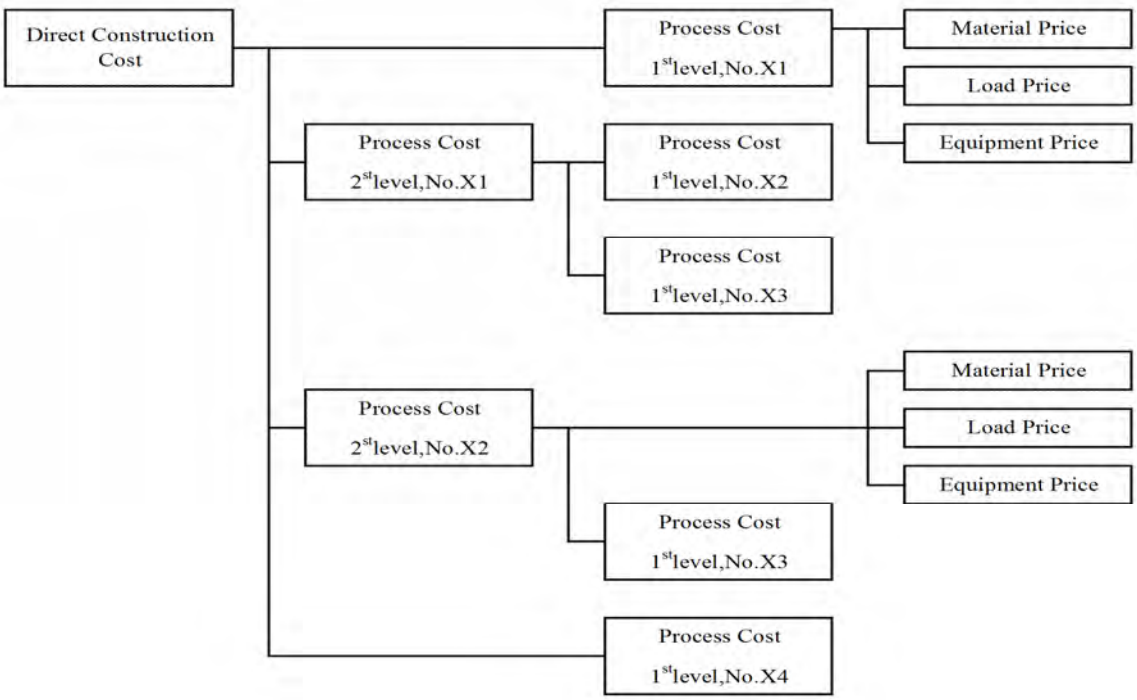


Figure-4.6.2 Components of Construction Cost（2/2）

(1) Direct Construction Cost

The calculation method of Direct Construction Cost was described in the following Table 4.6.6.

Table-4.6.6 Calculation Method of Direct Construction Cost

<Civil Works>
i) General The construction costs were calculated the quantities of major construction works multiplied by the unit prices. The quantities of major construction works were calculated in the Study, and unit prices were set up based Indonesian construction sample and the data of the similar projects etc. Then, the unit prices were assumed with referring to the supplier's quotations. ii) Material Prices Prices of major materials are collected from suppliers in Jakarta, in general. For several materials not available in Indonesia, the import prices from Japan were surveyed. iii) Labor Prices Indonesian labor cost was included in the unit price of each item of Engineering. Salary of Foreign Expatriate was based on Japanese Norm. iv) Equipment Prices Equipment operation cost was calculated including as well as labor cost.
<Architectural Works>
The construction cost for architectural works was estimated by multiplying roof area (m2) and the unit price estimated for artificial ground roof, walkway roof.
<Facilities>
The construction costs for facilities were estimated with reference to the unit price per m2 of three major items "Electrical System", "Air Conditioning & Ventilation System" and "Water Supply & Drainage System" of Japan. The costs for escalators were individually calculated.

(2) Indirect Construction Cost

The following indirect costs were estimated as percentage multiplied to the construction costs generally based on the Japanese standards for construction cost estimate.

- Common Expense for Temporary Works
- Site Management Cost
- General Administration Expenses & Overheads

(3) Items estimated in FCC and LCC

Breakdown of the construction unit price was divided into Foreign Currency and Local Currency on the basis of the possibility of procurement in Indonesia. After the unit price of each item of construction was estimated, the construction costs were calculated to multiply by the quantity.

Items estimated in FCC (Foreign Currency Components in Japanese Yen)

(1) Construction Cost
- Material, Labor and Equipment to be imported
- General Administration Expenses & Overheads in Construction Cost

(2) Interest during Construction for Construction & Consulting Services

(3) Commitment Charge

Items estimated in LCC (Local Currency Components in Indonesia Rupiah)

(1) Construction Cost
- Material, Labor and Equipment to be procured in Indonesia

(2) Administration Cost

(3) VAT

The ratios of cost of FCC and LCC were summarized in Table-4.6.7.

Table-4.6.7 Summary of Cost of FCC and LCC

Item	Cost		
	F.C.C (Mil.JPY)	L.C.C (Mil.IDR)	Total in Mil. JPY
Phase-1	2,757 (45.2%)	366,884 (54.8%)	6,100
Phase-2	4,007 (51.9%)	406,908 (48.1%)	7,714

4.6.6 Consulting Service Fee

The assumed Consulting Services in the Project Cost were summarized in the followings:

Public Sector

(1) Project Management Consultant, including
- Coordination of design and construction between Public and Private
- Project Management and Advisory Services for the Employer

(2) Detail Design（Public）

(3) Construction Supervision (Public）