Addendum No. 2 to the

Environmental Impact Assessment

(January 2016 version and First Addendum July 2016)

For the

Dhaka Mass Rapid Transit Development Project

Prepared for

Dhaka Mass Transit Company

By NKDM

April 2018

I. Summary

This is Addendum No. 2 to the detailed design stage Environmental Impact Assessment (EIA) prepared for the Dhaka Mass Rapid Transit Development Project. The addendum follows on the previous addendum (Addendum No. 1) submitted in July 2016, and introduces further changes to specific content of the January 2016 version of the EIA and the previous addendum.

There are five revisions (replacement or addition of text and figures) contained in this addendum, which are described in the following sections in the order of their appearance in the EIA report. A reference describing the nature of the revision is provided along with reference to a section in the January 2016 version of the EIA and, in some cases, the previous addendum, followed by a description of the adjustment to be made. A final table summarizes the changes and describes their consequences. Additional changes may be necessary as the project progresses, to be addressed in further addenda.

II. Revisions

1. Chapter 3, Sec. 3.3.3: Stations (Architectural Appearance)

The following is added at the end of the referenced section (following Fig. 3-11):

Figures contained in this section depict the architectural appearance of Motijheel, Bijoy Sharani and Uttara Center stations. Figures depicting architecture for the remaining 13 stations are as follows:

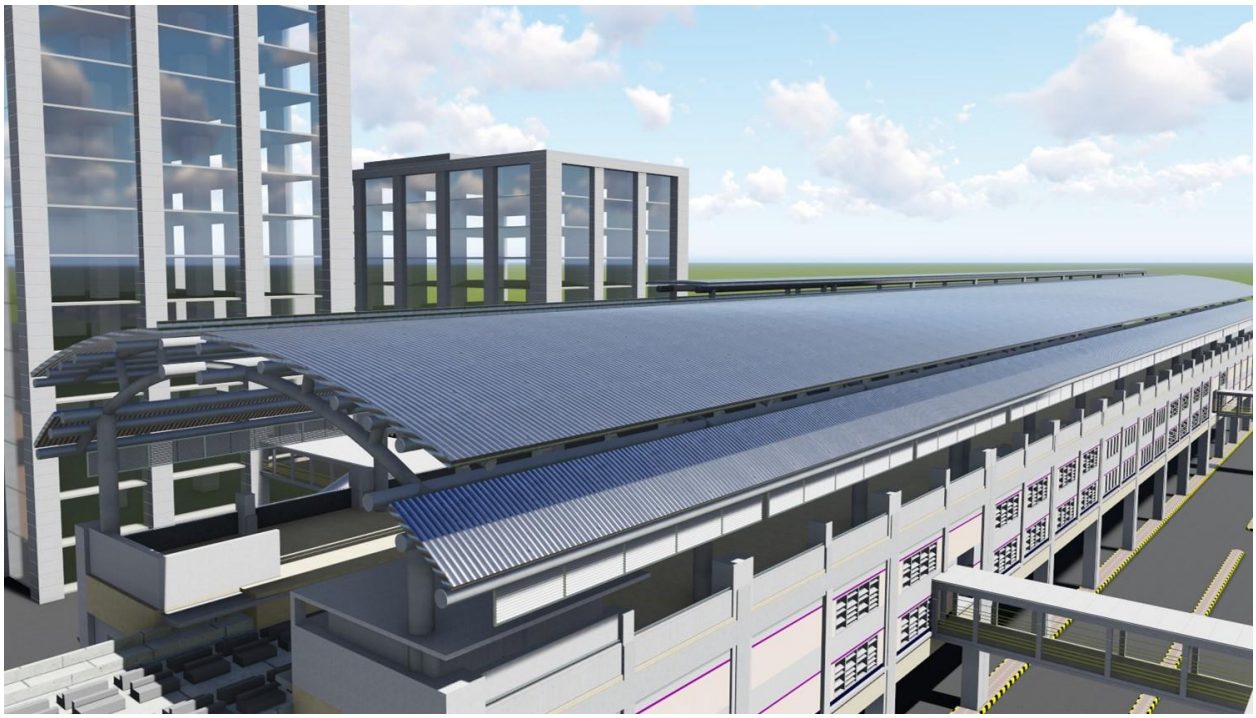


Figure A2 3-1: Station Roof Design

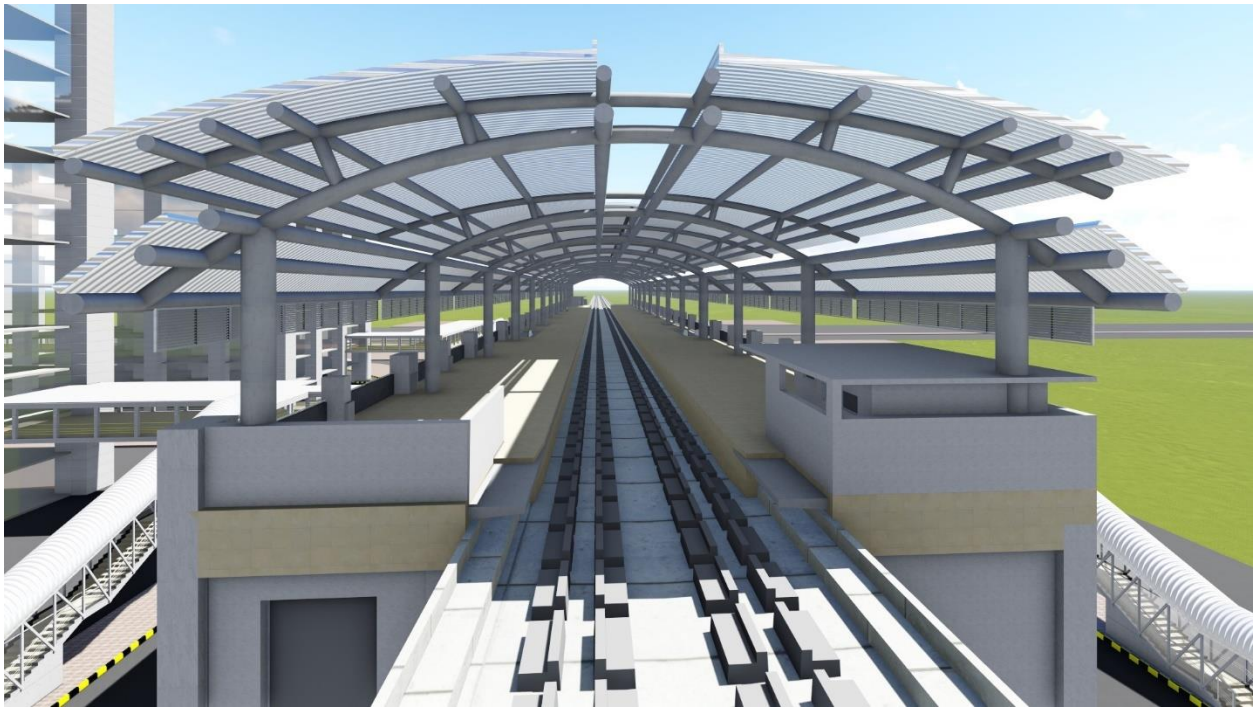


Figure A2 3-2: Station Approach

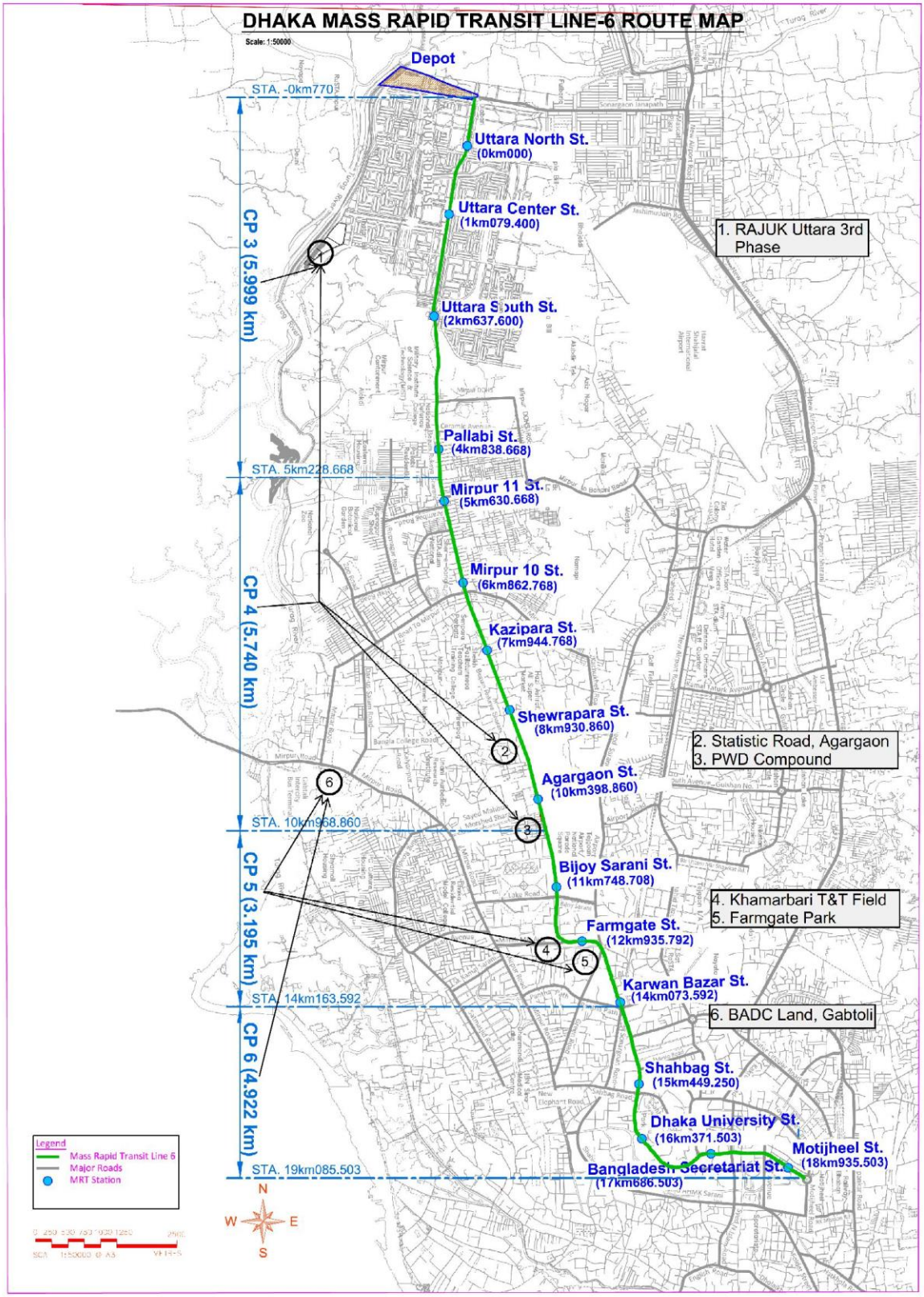
Figure A2 3-3: Stairwell Access

2. Chapter 3, Sec. 3.3.6: Temporary Construction Facilities (Note this revision also applies to Item 4 of Addendum No. 1)

Replace the paragraph with the following:

"Six locations have been identified for temporary construction facilities for use under contracts CP-3 – CP-6 (see the next section). These six sites are now confirmed, and are located as shown in Figure 3-12. Environmental aspects of these sites are evaluated in Chapter 6."

Update Figure 3-12 contained in the EIA with the following: (next page)



3. Chapter 3, Sec. 3.3.6: Temporary Construction Facilities

Add after the previous paragraph under this section (Item 2, above), the following:

A temporary road is constructed across the Cantonment Lake following the alignment of the viaduct between Uttara South and Pallabi Stations. The Cantonment Lake road is 800 m in length, with a 19 m top width and 32 m bottom width, and overall thickness around 4.5 m (lake bottom at 0.5 masl, finished road grade at 5 masl). It consists of two sand layers built up between bamboo barrier walls and sandbags and compacted in place. There are 7-0.6 m Ø and one- 1 m Ø cross pipes that allow exchange of water across the lake. The upper surface is compacted in place and a macadam surface is applied.

The roadway is constructed in order to provide a working platform for the contractor to install pilings, piers and viaduct segments from Sta. 2+727.6 (south end of Uttara S. Station) to 3+527.8, and it is planned to be removed following completion of construction.

The road is constructed with full permission of the Cantonment Authority, and in keeping with their requirements, extensive baseline water quality sampling and analysis was performed of the lake water. Follow-up analyses will be taken to substantiate that there are no impacts on water quality. Sampling and analysis of lake water will be conducted at regular intervals up to and during the time of removal of the lake road.

4. Chapter 6, Sec. 6.7.1 Solid Waste and Hazardous Materials (Spoil Disposal)

Add to the end of the section (following heading titled "Alignment" and subsequent bullets):

Spoil Disposal Area

A spoil disposal area near the location for the Uttara Central Station has been identified for use by all four of the alignment contract packages (CP 3-6) (Figure A2 6-1).

The area of approx. 7.2 ha is a semi-submerged lowland slated for infilling as part of the development scheme for Uttara Phase III. Use of Class III spoil materials disposed of at the site accomplishes this purpose and is in keeping with the plan to fill the area.

Materials for fill will be limited to those identified in Table 6-25 (in Jan 2016 EIA), specifically

a. Earth and bentonite slurry from column excavation
b. Earth removal from median strip
c. Earth removal for pile cap placement

However, bricks and rubble from removal of median strip and bituminous scrap from removal of roadway sections, as well as any other demolition material will not be allowed at the site. The quantity of material has been estimated at around 190,000 m3, whereas the fill volume available at the site is between 240,000 and 350,000 m3 depending on the final height of fill.

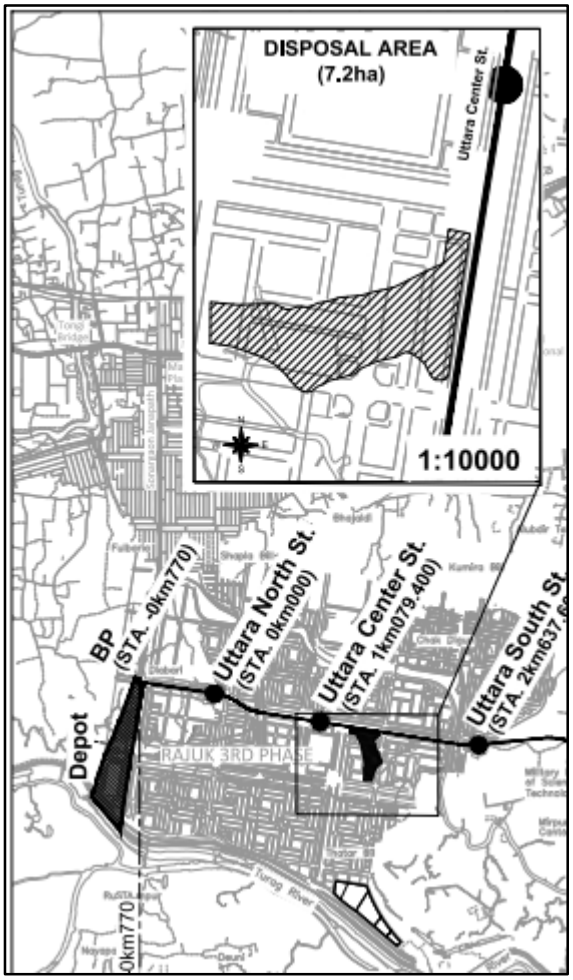


Figure A2 6-1: Proposed Location for Spoil Disposal in Uttara Phase III

The spoil material is generated during construction of the alignment under four separate contracts. The fill will be placed progressively from four locations (one per contract) as shown in Figure A2 6-2. The water level in the fill area is typically low during the dry period of the year, so pumping is not required; nor is it expected that at any time the area will need to be dewatered. Rather it will be progressively filled and ponded water allowed to evaporate or seep into the ground. A view of the site is shown in Figure A2 6-3.

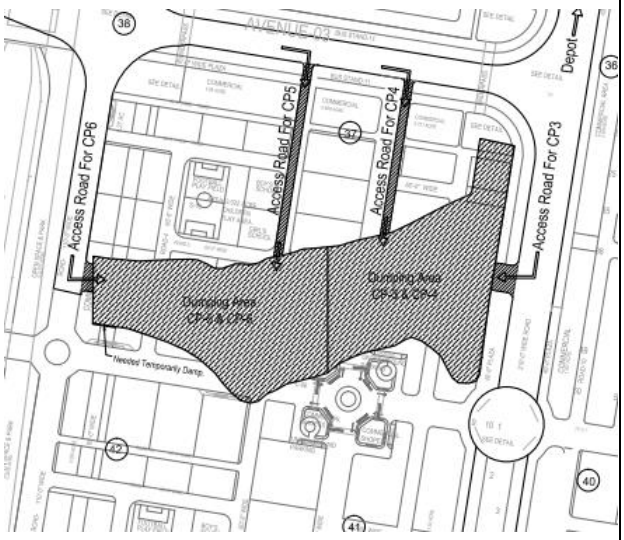


Figure A2 6-2: Access Points (CP 3-6)

Figure A2 6-3: View from Northeast

The area is targeted to be filled under the Uttara Phase III development plan. The main environmental concern is to protect water quality downstream of the location, since runoff from the area discharges to Lake 10, making its way to the Goranchatbari Pump Station and the Turag River. While the potential for environmental impact is not great, the following guidelines should still be followed:

- Materials to be disposed of at the site are limited to Class III inert materials as listed previously.
- No paper, plastic, organic waste, or oily waste is allowed to be disposed of at the site.
- Materials should be placed in a relatively dry state, and areas already filled graded to a level surface.

5. Chapter 6, Sec. 6.13.2: Temporary Construction Facilities/Sites and Locations (These revisions also apply to Item 6 of Addendum No. 1)

Delete the opening paragraph and replace with the following:

> "Six temporary construction sites (TCS) have been selected as locations for construction-related activities and are described herein."

Delete the headings and associated paragraphs entitled Golapbagh and Dupkhola Field, as these sites will no longer be used.

Replace those headings and paragraphs with the following:

Gabtoli

Vacant land is available in the Gabtoli area along Mirpur Rd that is part of the Bangladesh Agricultural Development Cooperative (BADC). The 7.5 ha parcel of land is sufficiently large to accommodate both CP-05 and CP-06 contracts (2.5 ha and 5 ha, respectively). The area is low in elevation, and will need to be filled prior to use. Environmental concerns that are described in the following section.

6. Chapter 6, Sec. 6.13.3: Potential Impacts and Mitigation Measures

Delete the headings and associated paragraphs entitled Golapbagh and Dupkhola Field, as these sites will no longer be used. Replace those headings and paragraphs with the following:

Gabtoli

The site for the Gabtoli construction yard is located off Mirpur Rd. near the Gabtoli bus terminal, as shown in Figure A2 6-4. The designated area is centrally located and sufficiently close to the CP-05 and CP-06 alignments to provide acceptable locations for the main construction yards for these two contract packages. BADC which owns the land has agreed to lease the land to DMTCL and for infilling and temporary use in construction. The letter of agreement specifies that the land will be returned to BADC in its original condition.

Hence the land will undergo long term, if not permanent, alteration from an agricultural lowland suitable for rice production – despite being located within a rapidly urbanizing area – to a raised, well-drained site given over to commercial though temporary forms of land use. As part of this alteration, there will be changes in the environmental resources associated with the site.

There will need to be suitable accommodation of traffic to ensure access and egress at the site. Special drainage accommodation will also be necessary. Introduction of new land uses to the area are likely to increase noise and dust levels. These aspects are addressed in the following paragraphs.

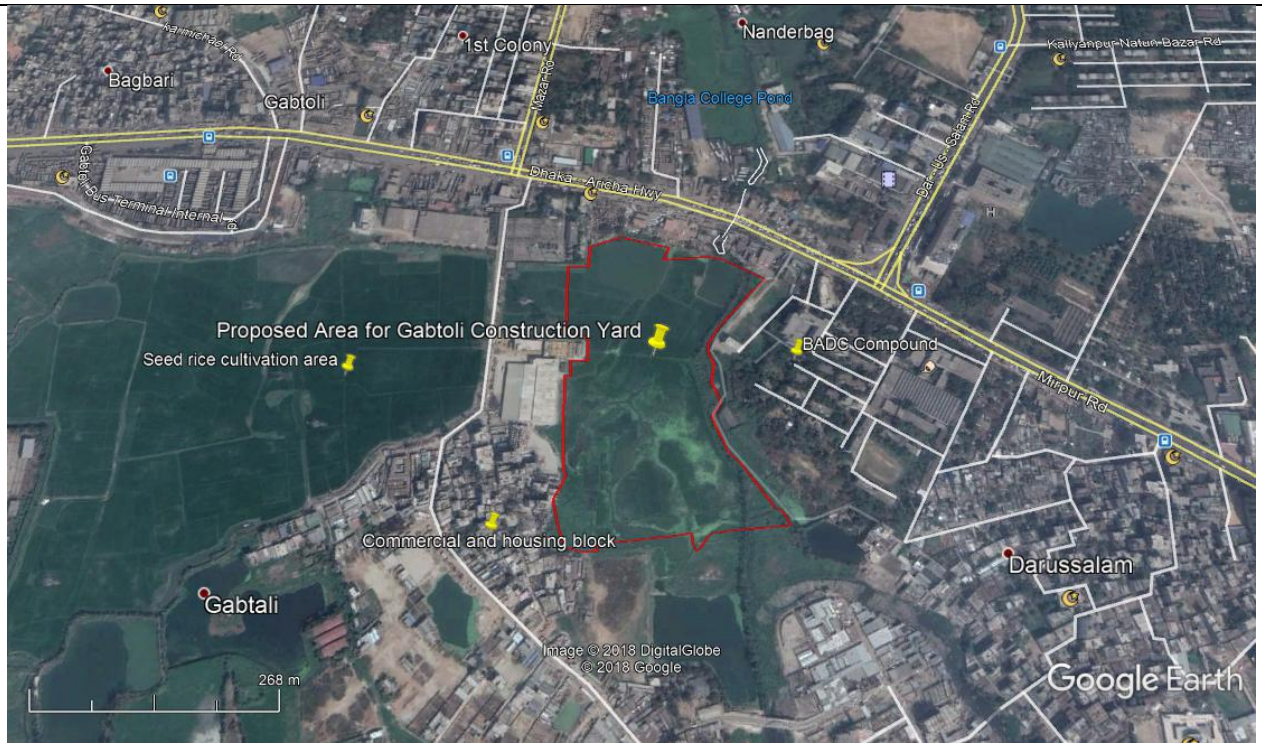


Figure A2 Error! No text of specified style in document.**-4: Gabtoli TCS Location**

Drainage

The designated area is currently low-lying land that has been used by BADC for cultivation of seed stock for distribution in accordance with its mandate, an activity that continues at a location adjacent to the site to the west. Probably the area was originally part of a natural drainage channel, a system of khals linking upstream drainage areas to the Turag River via the Kalyanpur Khal, a major drainage in this part of the City. A branch of the khal passes under the road and is routed along the eastern slope of the lowland in an elevated, purpose-built channel, which skirts the lowland and discharges into the main Kalyanpur Khal at a downstream location. The drainage channel under the roadway and flowing along the embankment is shown in Figure A2 6-5a (outlined in white), while Figure A2 6-5b is a photograph of the perimeter drain.

a: map	b: photo (Jan 2017)

Figure A2 Error! No text of specified style in document.**-5: Kalyanpur Khal**

To facilitate upstream drainage, the drainage channel skirting the designated area on the east will need to be maintained in a free-flowing condition. Elevation of the area should be higher than the channel, and capable of gravity discharge into the channel at a few locations that can be monitored for water quality once the construction yards are in use.

Some flows may currently discharge directly into the designated area from the southwest, the area labeled as a commercial and housing block on Figure A2 6-4. If so, these drains will need to be extended in a free-flowing condition (gravity flow) by installation of a buried conduit or slot/rectangular RCP drain with sufficient slope to transport the flow to a point of discharge, most likely to the south into Kalyanpur Khal, but perhaps to the west. Otherwise drainage in this built up area will be impeded, and building plumbing systems may not work correctly, as well as the area becoming flooded during rainy periods.

The designated area will need to be developed with onsite drainage designed to segregate clean from contaminated runoff. Perimeter and internal slot drains should discharge at a limited number of designated locations. Any contaminated flows (toilet / bathhouse water, canteen waste flows, wash water from truck stands, and storm water from areas where machine work is ongoing) will need to be kept segregated from clean storm water and routed to internal treatment.

All drainage should ultimately be discharged into Kalyanpur Khal (following appropriate treatment where necessary) rather than to the lowland area to the west of the designated area.

Access and Egress

Access is along Mirpur Road (Dhaka-Aricha Hwy). There are established activities along the frontage, shown in Figure A2 6-6, some of which may need to be shifted to provide sufficient driveway easement for the site.

While access along Mirpur Rd for vehicles approaching along outbound lanes is relatively simple, vehicles leaving the site and turning into the flow of inbound traffic requires a right-turn across the line of outbound traffic or merging with that traffic and effecting a U-turn before the nearby intersection at Mazar Rd. Signaling by use of flagmen and other forms of traffic control are needed to accommodate these conditions.

Figure A2 6-6: View of Land Use Activity along Frontage of Gabtoli Site

Air and noise impacts

Due to proximity of institutional, commercial and residential land uses, air and noise impacts are possible. Some residential buildings are immediately adjacent to the site to the southwest. Institutional buildings housing the BADC training center are located to the east at a distance of 150 m.

The nighttime standard for noise during construction (project standard) is 65 dB. The combination of a concrete mixer truck and a derrick crane produces a combined Leq of 90 dB. When operating at a distance of less than 70 m from a sensitive receptor (residential block), this combination of equipment is likely to violate the project standard. Violation of the daytime standard of 85 dB is less likely.

Contractors should site noise producing activities in view of surrounding land uses, situated away from residential blocks and closer (as necessary) to institutional and commercial land uses that do not support nighttime activity. To the extent possible, confining noisy activities to the daytime can also alleviate complaints. Shielding of noise producing activities may also be required, as with other noise control measures described in Sec. 6.1.2 of the EIA.

Air emissions (dust) at the site can adversely affect nearby areas. Contractors will be required to pave driving areas, maintain a non-friable non-dust producing fill in other areas, control dust emissions from batch plants through use of modern equipment (dust filters on silos and mixing chambers), and use of spray watering at regular intervals to suppress dust. Other means for controlling dust as described in Sec. 6.3.4 of the EIA are to be applied as appropriate.

III. Addendum Summary

Five (5) revisions have been submitted in this Addendum, which involve replacement or addition of text and figures in order to elaborate the design and to describe facilities that are provided for construction. Environmental impacts are associated with one of the changes, impacts that can be mitigated by means described in the EIA. These are recapped in the following table.

Seq.No.	*Short Description*	*Page/Sec. Ref*	*Consequence*
1.	Architectural Appearance of Stations	Chapter 3, Sec. 3.3.3	Elaboration of design
2.	Construction Yards/Identification of Sites	Chapter 3, Sec. 3.3.6	Necessary to provide facilities for construction
3.	Cantonment Lake Road	Chapter 3, Sec. 3.3.6	Necessary to provide facilities for construction
4.	Spoil Disposal Location	Chapter 6, Sec. 6.7.1	Minor environmental impact on water quality
5.	Construction Yards/Environmental Assessment	Chapter 6, Sec. 6.13.2 and 6.13.3	Environmental impact on drainage, traffic, air quality and noise level that will need to be mitigated in accordance with methods described in the EIA.