A6 to MANCHESTER AIRPORT RELIEF ROAD

Retaining Structures
Preliminary Design Report

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STOCKPORT METROPOLITAN BOROUGH COUNCIL

MANCHESTER CITY COUNCIL

Cheshire East Council

PRELIMINARY DESIGN REPORT

Report Name: **Retaining Structures**

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Report Control Sheet

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Contents

1 R002A – Pumping Station Retaining Wall

1.1 Description

Retaining wall R002A runs parallel to the westbound carriageway of A6MARR. It is located approximately 40m from the Woodford Road Bridge at an approximate mid-length A6MARR chainage of 11452m. The retaining wall is approximately 21.0m in length and the top of the retaining wall is at 84.0mAOD with an approximate 2.0m retained height and 1v:3h slope, approximately 3m high above it. The A6MARR route is in a cutting at this location and a proposed pumping station is required to be constructed. Wall R002A is required to create an area outside of the main carriageway to locate the pumping station compound.

A location plan at 1:1000 scale is shown on drawing 1007/3D/DF7/A6-MA/R002A/004 within Appendix A.

1.2 Geotechnical Information

The ground and groundwater conditions for the retaining wall have been assessed using relevant geological maps (Stockport Sheet 98, Solid and Drift Scale 1:50,000) and six exploratory hole logs provided by a number of phases of GI for the area. The relevant bore holes are EA POYNTON 86_1, EA POYNTON 86_2, EA POYNTON 86_3, EA POYNTON 86_4, EA POYNTON 87_1 and EA POYNTON 87_2.

The ground conditions described on the geological maps indicate boulder clay of recent and Pleistocene age, over pebble beds, of Permian to Triassic age which are part of the Sherwood Sandstone group.

From the available ground investigation exploratory hole logs, it is anticipated that the retained material below pile head level will be predominately sandy clay (glacio fluvial clay) with inter-bedded glacial sands and gravels and high groundwater table. The ground conditions identified within ground investigation did not encountered rock head in this location.

It is considered unlikely, based on the available information, that coal working will be encountered during the works.

1.3 Groundwater

Groundwater strikes were encountered in all relevant exploratory bore holes with the highest noted at 85.97mAOD rising from 82.62mAOD after 20 minutes. Weep-holes and drainage will be included in the final design stage to ensure that the water level does not rise about the height of the retaining wall.

1.4 Form of Construction

Based on the permanent retained height of up to 2.0m and slope behind (1v:3h), it is proposed that R002A will be a sheet pile wall. The wall will be constructed before the pumping station and monitoring apparatus is installed.

A steel channel section will be welded to the top of the wall to provide an aesthetically pleasing finish. 1.1m high edge protection will be mounted on the channel section.

The exact length of the piles would need to be confirmed after detailed ground investigations have been carried out and the final design undertaken. However, a total pile length of 8m can be estimated for the 2.0m permanent retained height and slope behind.

It is assumed that the pumping station will be designed such that it provides rigid support to the wall in front without applying additional loads on it. It is also assumed that the wall will be fully supported during construction of the pumping station and in the long term. If these assumptions are correct then there is no need to increase the pile length next to the pumping station. If this is not possible then an increase in sheet pile wall length or change to bored piles will be required. More information regarding the depth of the pumping station will be required to make this decision.

Additional pile length or a change of solution to a bored pile wall may be needed in case the pumping station walls are not able to provide the required support to the sheet piled wall. The sheet pile section size will depend on the applied shear forces and bending moments and the aggressivity of the in-situ soil and therefore these will be established at the final design stage.

The general arrangement of the proposed solution is given on drawing 1007/3D/DF7/A6-MA/R002A/004 within Appendix A.

1.5 Appearance

The exposed face of the sheet pile wall will be faced with brick masonry for an aesthetically pleasing and durable finish that matches the other structures on the A6MARR.

SPT (SEMMMS Project Team, based at SMBC offices) has advised that environmental impact issues for the A6MARR will be dealt with by environmental consultant, Mouchel.

This small retaining wall when considered as an individual entity will have minimal visual impact when considering the rest of the construction work undertaken in the local vicinity.

2 R003 & R004 – Woodford Road Retaining Walls

2.1 Description

The proposed A6MARR route alignment cuts below the existing junction between the A555 (which is being incorporated into the scheme) and Woodford Road (A5102). This junction is being fully reconfigured to accommodate the scheme. To the east of Woodford Road, the proposed highway alignment is significantly lower than existing ground level and in close proximity to residential properties. The appropriate solution for this location is for reinforced concrete contiguous bored pile walls to retain the ground at either side of the scheme. The walls will be propped below ground level. The walls will be adjoined to the abutments to Woodford Road Junction Bridge B010B.

2.1.1 R003

This wall will retain the ground adjacent to the westbound A6MARR carriageway. The wall will be approximately 100m in length and is located at a mid-length A6MARR chainage of 13235m. The retained height is approximately 10m.

A location plan at 1:1000 scale is shown on drawing 1007/3D/DF7/A6-MA/B010B/707 located in the bridge report 1007/704/160 – B010B.

2.1.2 R004

This wall will retain the ground adjacent to the eastbound A6MARR carriageway. The wall will be approximately 100m in length and is located at a mid-length A6MARR chainage of 13238m. The maximum retained height is approximately 10.0m.

The A6MARR pedestrian/cycle route connects to Woodford Road at this location and is located between the top of the retaining wall and the boundary of the private property in this location.

A location plan at 1:1000 scale is shown on drawing 1007/3D/DF7/A6-MA/B010B/707 located in the bridge report 1007/704/160 – B010B.

2.2 Geotechnical Information

The ground conditions for the Woodford Road Junction East and West Retaining Walls have been assessed using relevant geological maps (Stockport Sheet 98, Solid and Drift Scale 1:50,000). Three exploratory hole logs are located along the line of each retaining wall, therefore six exploratory holes have been reviewed. These bore holes are EA Poynton 69_1, EA Poynton 69_2, EA Poynton 69_3, EA Poynton 69_4 and EA Poynton 69_5, EA Poynton 69_6.

It is anticipated that the retained material below pile head level will be predominately soft to firm becoming stiff silty sandy clay (Glacio fluvial

clay) with inter-bedded medium dense sand layers. Below 70m AOD the material comprises a mixture of medium dense Glacio-fluvial sands and gravels and generally stiff glacial tills. The ground conditions identified within the ground investigation did not encountered rock head in this location.

It is considered unlikely, based on the available information, that coal working will be encountered during the works.

The potential for chemical attack on buried concrete within the ground has not been assessed due to lack of available information. However, based on the past experience in similar material e.g. pyrites in coal measures and sulphates in superficial material derived from Mercia mudstone, aggressive ground conditions towards concrete/steel cannot be ruled out. It is recommended to undertaken sulphate testing in accordance with BRE Special Digest 1: 2005 (Concrete in aggressive ground condition).

2.3 Groundwater

Groundwater strikes were encountered in five out of the six relevant exploratory bore holes with the highest noted at 84.00mAOD rising from 80.45mAOD after 20 minutes. The ground water table is significantly higher than the proposed road level therefore drainage will be required at the back of the wall.

2.4 Form of Construction

Based on the maximum retained height of 10m and the nature of the material to be retained, the construction of 27m long, 1800mm diameter reinforced concrete contiguous bored piled walls with reinforced concrete capping beams is proposed at this stage of design.

A single prop will be required below the carriageway. It has been assumed that the piles will be fully supported during construction until the ground beam is constructed and can take the full load. Without this assumption, significantly longer piles will be required.

This form of construction will avoid bulk excavation required for the construction of footings for gravity, cantilever retaining or reinforced earth walls and the potential destabilisation this may cause to the surrounding properties.

The contiguous pile walls would be constructed prior to the A6MARR cutting being excavated and therefore temporary sheet piling would not be necessary.

The general arrangements of the proposed solutions are given on drawing 1007/3D/DF7/A6-MA/B010B/707 located in the bridge report 1007/704/160 – B010B.

2.5 Appearance

Retaining wall R004 will require 1.4m high pedestrian/cyclist restraint parapet to be mounted to the capping beam to mitigate the risk of pedestrians or cyclists falling from height.

SPT has advised that environmental impact issues for the A6MARR will be dealt with by environmental consultant, Mouchel.

The new A6MARR cutting will have a significant impact on the residential properties in the vicinity. A contiguous bored pile retaining wall solution will limit the impact on these properties as much as practicably possible by minimising the land take required.

The exposed face of the wall will be faced with brick masonry for an aesthetically pleasing and durable finish that matches the other structures on the A6MARR.

The method of construction is consistent with surrounding structures thus minimising the requirement for importing different materials and plant to the site.

3 R009 – A34 Retaining Wall Adjacent to Eastbound Off Slip

3.1 Description

Retaining wall R009 is positioned adjacent to the eastbound off slip road at the junction between A555 (which is incorporated into the proposed A6MARR scheme) and the A34.

The total length of the retaining wall is 63m and is positioned at a A6MARR chainage of 171m at mid-length. The wall starts at ground level and rises to a maximum retained height of approximately 3.7m.

The wall is required to retain ground in order to accommodate a proposed new footpath/cycle rout link between A6MARR and Earl Road. The existing embankment slopes from the slip road down to the boundary of a retail park so re-grading the slope is not possible.

A location plan at 1:1000 scale is shown on drawing 1007/3D/DF7/A6-MA/R009/726 in Appendix A.

3.2 Geotechnical Information

The ground conditions for the A34 Retaining Wall have been assessed using relevant geological maps (Stockport Sheet 98, Solid and Drift Scale 1:50,000) only as no ground investigation has been carried within at or within the vicinity of the proposed structure.

The ground conditions indicated on the geological maps identify drift deposits of boulder clay of recent and Pleistocene age overlying upper

mottled sandstone of Permian and Triassic age which is part of the Sherwood Sandstone group.

Without ground investigation information it is not possible to know the thickness of the drift deposits but from investigations undertaken to the east and west along the route indicate the boulder clay/glacial till deposits to have thicknesses of between 5 and 15m.

3.3 Groundwater

No information available.

3.4 Form of Construction

It is proposed that from a retained height of 1m and above, the majority of R009 will be a sheet pile wall. Below a retained height of 1m, R009 will be a reinforced concrete gravity wall rising from ground level at the west end and tying in to the start of the sheet piles.

A gravity wall is more economical at a lower retained height where less excavation is required to form the footing. The length of the gravity wall section is 21m and the length of the sheet pile wall section is 42m.

The length of the piles would need to be confirmed after detailed ground investigations have been carried out and the design undertaken by the pile designer. However, pile lengths starting at 4m, increasing to 12m as the retained height rises, can be assumed at this stage.

A 1.4m high pedestrian/cyclist restraint parapet will be required to mitigate the risk of pedestrians or cyclists falling from height.

The general arrangement for the proposed solution is given on drawing 1007/3D/DF7/A6-MA/R009/726 in Appendix A.

3.5 Appearance

The face of retaining wall R009 will not be visible to A6MARR users. The wall will be visible from the retail park car park.

The exposed face of the wall will be faced with brick masonry for an aesthetically pleasing and durable finish that matches the other structures on the A6MARR.

SPT has advised that environmental impact issues for the A6MARR will be dealt with by environmental consultant, Mouchel.

The construction of the footpath/cycle route and retaining wall R009 will require the removal of established trees and vegetation which is currently obscuring the view of the A555. It may be necessary to reinstate this vegetation once construction is completed.

A soil nail reinforced earth solution with a lesser visual impact is not suitable at this location due to conflict between the required retained height and the amount of land take it would require encroaching the private property.

4 R010 – Wilmslow Rd Junction Adjacent to Eastbound Off Slip Retaining Solution

4.1 Description

A contiguous piled wall is proposed to retain the eastbound slip road off the A6MARR route to the junction with Wilmslow Road (B5358). At this location A6MARR will be in a cutting. The total length of the retaining solution is approximately 160m. The mid length A6MARR chainage of the solution is approximately 644m. From the available cross section the top of the retaining wall is assumed at 77.0mAOD and the retained height is estimated to be 4.1m.

A location plan at 1:1000 scale is shown on drawing 1007/3D/DF7/A6-MA/R010/008 in Appendix A.

4.2 Geotechnical Information

The ground conditions for the retaining solution R010 have been assessed using relevant geological maps (Stockport Sheet 98, Solid and Drift Scale 1:50,000) only, as no ground investigation has been carried out at or within the vicinity of the proposed structure. Local ground investigation will be required for the final design.

The ground conditions indicated on the geological maps identify drift deposits of boulder clay of recent and Pleistocene age overlying upper mottled sandstone of Permian and Triassic age which is part of the Sherwood Sandstone group.

Without ground investigation information it is not possible to know the thickness of the drift deposits but from investigations undertaken to the east and west along the route indicate the boulder clay/glacial till deposits to have thicknesses of between 5 and 15m.

It is considered unlikely, based on the available information, that coal working will be encountered during the works.

The potential for chemical attack on buried concrete within the ground has not been assessed due to lack of available information. However, based on the past experience in similar material e.g. pyrites in coal measures and sulphates in superficial material derived from Mercia mudstone, aggressive ground conditions towards concrete/steel cannot be ruled out. It is recommended to undertaken sulphate testing in accordance with BRE Special Digest 1: 2005 (Concrete in aggressive ground condition).

4.3 Groundwater

No information available.

4.4 Form of Construction

The topography and alignment of the A6MARR route and slip road permits the use of a contiguous pile wall in this location.

The exact length of piles required would need to be confirmed after a detailed ground investigation has been carried out and the final design undertaken. However, based on retained height and back slope, a 15.0m long and 600mm diameter bored piled wall can be assumed at this stage.

The general arrangement for the proposed solution is given on drawing 1007/3D/DF7/A6-MA/R010/008 in Appendix A.

4.5 Appearance

A capping beam will be formed to provide and aesthetically pleasing finish to the top of the contiguous bored pile wall. R010 will be visible to A6MARR users.

The exposed face of the wall will be faced with brick masonry for an aesthetically pleasing and durable finish that matches the other structures on the A6MARR.

SPT has advised that environmental impact issues for the A6MARR will be dealt with by environmental consultant, Mouchel.

5 R011 – Styal Road Electricity Sub Station

5.1 Description

Retaining wall R011 is positioned on the eastbound side of the proposed A6MARR at a A6MARR chainage of 2275m at mid length. The total length of the wall is approximately 20m. A6MARR will be on a low embankment at this location. The retaining wall is required to minimise the encroachment of the embankment into the boundary of the electricity substation. The top of the retaining wall is at 78.3mAOD with a maximum retained height of 1.8m.

A location plan at 1:1000 scale is shown on drawing 1007/3D/DF7/A6-MA/R011/009 in Appendix A.

5.2 Geotechnical Information

The ground conditions for the retaining wall R011 have been assessed using relevant geological maps (Stockport Sheet 98, Solid and Drift Scale 1:50,000) only, as no ground investigation has been carried out at or within the vicinity of the proposed structure. Local ground investigation will be required for the final design.

The ground conditions indicated on the geological maps identify drift deposits of boulder clay of recent and Pleistocene age overlying lower

'Keuper' marl over 'Keuper' waterstones, underlain by 'Keuper' sandstones, which are all part of the Mercia mudstone group of Triassic age.

Without ground investigation information it is not possible to know the thickness of the drift deposits but from investigations undertaken to the east and west along the route indicate the boulder clay/glacial till deposits to have thicknesses of between 5m and 15m.

It is considered unlikely, based on the available information, that coal working will be encountered during the works.

The potential for chemical attack on buried concrete within the ground has not been assessed due to lack of available information. However, based on the past experience in similar material e.g. pyrites in coal measures and sulphates in superficial material derived from Mercia mudstone, aggressive ground conditions towards concrete/steel cannot be ruled out. It is recommended to undertaken sulphate testing in accordance with BRE Special Digest 1: 2005 (Concrete in aggressive ground condition).

5.3 Groundwater

No information available.

5.4 Form of Construction

It is proposed that R011 will be a precast reinforced concrete L-shaped gravity wall on an in-situ reinforced concrete base due to the relatively low retained height. There is sufficient space to excavate for the base foundation which would be connected to the pre-cast wall using resin anchors.

There is no ground water information available however, if high ground water table is present than dewatering will be needed during construction.

A vehicle restraint parapet may be required due to the wall's proximity to the carriageway and to prevent vehicles transgressing into the electricity substation.

The general arrangement for the proposed solution is given on drawing 1007/3D/DF7/A6-MA/R011/009 in Appendix A.

5.5 Appearance

The concrete face of the retaining wall will not be visible to A6MARR users. The exposed face of the wall will be faced with brick masonry for an aesthetically pleasing and durable finish that matches the other structures on the A6MARR.

SPT has advised that environmental impact issues for the A6MARR will be dealt with by environmental consultant, Mouchel.

The visual impact of retaining wall R011 as an individual entity should be considered as minimal.

6 R016 - Retaining Wall Associated with the Existing Styal Road Rail Bridge (Airport Spur South)

6.1 Description

Retaining wall R016 is positioned south of the intersection of the A6MARR route and Styal Road (B5166). It is situated in close proximity to the north east wing wall of the existing bridge over the Airport Spur South railway line.

Wall R016 is within the cutting for the railway line. It is therefore proposed to retain imported fill supporting the slip road for westbound traffic turning left from A6MARR onto Styal Road.

The approximate A6MARR chainage of wall R016 is 2373m at mid length. The total length of the wall is approximately 21m. The maximum retained height, at the interface with the existing bridge wing wall, is approximately 7m.

A location plan at 1:1000 scale is shown on drawing 1007/3D/DF7/A6-MA/R016/729 in Appendix A.

6.2 Geotechnical Information

The ground conditions for the retaining wall R016 have been assessed using relevant geological maps (Stockport Sheet 98, Solid and Drift Scale 1:50,000) only as no ground investigation has been carried out at or within the vicinity of the proposed structure.

The ground conditions indicated on the geological maps identify drift deposits of boulder clay of recent and Pleistocene age overlying lower ‘Keuper’ marl over ‘Keuper’ waterstones, underlain by ‘Keuper’ sandstones, which are all part of the Mercia mudstone group of Triassic age.

Without ground investigation information it is not possible to know the thickness of the drift deposits but from investigations undertaken to the east and west along the route indicate the boulder clay/glacial till deposits to have thicknesses of between 5m and 15m.

6.3 Groundwater

No information available.

6.4 Form of Construction

It is proposed that R016 will be a reinforced concrete cantilever wall on spaced bored pile foundations. This decision is based upon the following influencing factors:

- *Proximity to the railway* – Bored pile foundations will minimise the risk of ground settlements disrupting the track alignment.
- *Proximity to an existing structure* – Bored pile foundations will minimise the risk of ground settlements which may affect the existing bridge over the Airport Spur South railway line.
- *Proposed structures in the vicinity* – The feasibility study for bridges B014 & B015 (extensions to Styal Road bridge over the Airport Spur North) (Report No: 47060785/B014,B015) details the preferred substructure design option to be on piled foundations. Design and construction methodology should be consistent.
- *Design for vehicle impact* – The parapet on top of R016 will need to provide vehicle restraint. H4a, very high containment, parapets will be required. A reinforced concrete wall can be designed to the required strength necessary to accommodate loading associated with vehicle restraint.

The length of the piles would need to be confirmed after detailed ground investigations have been carried out and the design undertaken by the pile designer. 900mm diameter piles can be assumed at this stage.

The general arrangement for the proposed solution is given on drawing 1007/3D/DF7/A6-MA/R016/729 in Appendix A.

6.5 Appearance

The appearance of retaining wall R016 is consistent with the existing and proposed structures in the vicinity. The exposed face of the wall will be faced with brick masonry for an aesthetically pleasing and durable finish. The parapets will also clad to match the existing.

SPT has advised that environmental impact issues for the A6MARR will be dealt with by environmental consultant, Mouchel.

The visual impact of retaining wall R016 as an individual entity should be considered as minimal. The method of construction is consistent with surrounding structures thus minimising the requirement for importing different materials and plant to the site.

7 TR1 B – Retaining Wall for Attenuation Pond

7.1 Description

A sheet pile wall is proposed to retain an attenuation pond. The A6MARR chainage of this 21m long wall is 10294m. The top of the retaining wall is at 80mAOD with an approximate 3.0m maximum retained height (including the attenuation pond depth) and a 1v:2h, 1m high back slope. Behind the small slope there is a narrow un-surfaced

road beyond which there is a shallow slope about 5m high. 2.0m in front of the wall there is an attenuation pond approximately 1.0m deep.

A location plan at 1:1000 scale is shown on drawing 1007/3D/DF7/A6-MA/TR1B/003 in Appendix A.

7.2 Geotechnical Information

The ground and groundwater conditions for the TR1-B retaining wall have been assessed using relevant geological map (Stockport Sheet 98, Solid and Drift Scale 1:50,000) and 5 No. exploratory bore holes logs. The relevant bore holes are EA Poynton 98 -3 and EA Poynton 98 - 5 (most relevant). EA Poynton 98-1, EA Poynton 98-2, EA Poynton 98-4, EA Poynton 99-1, EA Poynton 99-2 and EA Poynton 99-1R have also been used.

It is anticipated that the retained material below pile head level will be predominately sand/gravel (Glacio Fluvial) with occasional inter-bedded clay layers and high groundwater table. The superficial deposits at these locations are up to 7m deep below pile head level and comprise a mixture of medium dense glacio-fluvial sands and gravels and generally firm to stiff glacial tills. Below 73.5mAOD the material is completely weathered sandstone. Due to the proximity of the brook, the presence of soft to firm alluvial material cannot be ignored.

It should be noted that due to the presence of coal measures strata and the possibility of encountering coal seams during construction a Coal Authority Licence will be required for any excavation/drilling in the seams. It may also be required that a topsoil strip is undertaken along the scheme in advance of construction to reduce the risk of encountering un-recorded shafts/ shallow workings. Additional investigation may also be required at structural locations prior to the final design to confirm the presence of any voids.

7.3 Groundwater

Groundwater strike was encountered in one relevant exploratory bore hole at 71.14mAOD which rose very quickly to 76.54mAOD after 20 minutes.

7.4 Form of Construction

The sheet pile wall will have a maximum retained height of 2.0m. The exact length of the piles would need to be confirmed after detailed ground investigations have been carried out and the final design undertaken. Based on the retained height and back slope and presence of the pond, a pile length of 9.0m can assumed at this stage.

A steel channel section will be welded to the top of the wall to provide an aesthetically pleasing finish. 1.1m high edge protection will be mounted on the channel section.

The general arrangement of the proposed solution is given on drawing 1007/3D/DF7/A6-MA/TR1B/003 within Appendix A.

7.5 Appearance

The exposed face of the wall will be faced with brick masonry for an aesthetically pleasing and durable finish that matches the other structures on the A6MARR.

SPT has advised that environmental impact issues for the A6MARR will be dealt with by environmental consultant, Mouchel.

This small retaining wall when considered as an individual entity will have minimal visual impact when considering the rest of the construction work undertaken in the local vicinity.

8 TR1 G – Retaining Walls to Support Widened Path and Dairy House Lane

8.1 Description

The proposed retaining structures parallel to, and in between the A555 and Dairy House Lane will be sheet pile walls. The length of the longer wall retaining the footway will be approximately 244m long. There is an existing U shape concrete channel at the toe of a slope on the passive side of this wall. The maximum retained height is 1.2m but there is also a slope down to a U shaped channel. The top of this channel is 2.5m below the crest of the slope.

The shorter wall retaining Dairy House Lane where required will be approximately 70m long. The maximum retained height is 1.5m.

A location plan at 1:1000 scale is shown on drawing 1007/3D/DF7/A6-MA/TR1G/006 in Appendix A.

8.2 Geotechnical Information

The ground conditions for the retaining solution TR1G have been assessed using relevant geological maps (Stockport Sheet 98, Solid and Drift Scale 1:50,000) only as no ground investigation has been carried out at or within the vicinity of the proposed structure. Local ground investigation will be required for the final design stage.

The ground conditions indicated on the geological maps are drift deposits of boulder clay of recent and Pleistocene age overlying upper mottled sandstone of Permian and Triassic age which is part of the Sherwood sandstone group.

It is considered unlikely, based on the available information, that coal working will be encountered during the works.

8.3 Groundwater

No information available.

8.4 Form of Construction

Both retaining walls will be sheet pile walls. The shorter has a maximum retained height of 1.5m and a shallow sloping ground up to 1m in front of the wall. The exact length of the piles would need to be confirmed after detailed ground investigations have been carried out and the final design undertaken. However, a total pile length of 6.0m can be assumed as an estimate.

The longer sheet pile wall will have a maximum retained height of 1.2m. An existing U shape concrete channel is located in front of the wall. The exact length of the piles would need to be confirmed after detailed ground investigations have been carried out and the design undertaken by the pile designer. However, a pile length of 6.0m is estimated.

A steel channel section will be welded to the top of the wall to provide an aesthetically pleasing finish.

The general arrangement of the proposed solution is given on drawing 1007/3D/DF7/A6-MA/TR1G/006 within Appendix A.

8.5 Appearance

The exposed faces of the walls will be faced with brick masonry for an aesthetically pleasing and durable finish that matches the other structures on the A6MARR.

SPT has advised that environmental impact issues for the A6MARR will be dealt with by environmental consultant, Mouchel.

9 TR1 M – Retaining Wall for Landing Light

9.1 Description

The purpose of retaining wall TR1M is to protect the exposed face of a landing light reinforced concrete foundation (reference 23R/20/RRR). The foundation is 1m square and 0.8m deep. The retained height adjacent to the landing light is also approximately 0.8m.

The wall is located at approximately A6MARR mid-chainage 3040m.

A location plan at 1:1000 scale is shown on drawing 1007/3D/DF7/A6-MA/TR1M/011 in Appendix A.

9.2 Geotechnical Information

The ground conditions for the retaining solution TR1 M have been assessed using relevant geological maps (Stockport Sheet 98, Solid

and Drift Scale 1:50,000) only as no ground investigation has been carried out at or within the vicinity of the proposed structure. Local ground investigation will be required for the final design stage.

The ground conditions indicated on the geological maps identify drift deposits of boulder clay of recent and Pleistocene age overlying lower 'Keuper' marl over 'Keuper' waterstones, underlain by 'Keuper' sandstones, which are all part of the Mercia mudstone group of Triassic age.

From the available long section for the scheme based on existing GI information, it is anticipated that the retained material below pile head level will be predominately made ground overlaying glacial tills with inter-bedded glacial sands and gravels overlaying mudstone. It is noted that the borehole logs for this section were unavailable at the time of writing.

It is considered unlikely, based on the available information, that coal working will be encountered during the works.

9.3 Groundwater

No information available.

9.4 Form of Construction

A pre-cast reinforced concrete gravity wall and piled solutions are not required to retain the foundation. It is proposed that a 6m long curved brick wall is constructed in front of the foundation and backfilled with concrete.

The general arrangement of the proposed solution is given on drawing 1007/3D/DF7/A6-MA/TR1M/011 within Appendix A.

9.5 Appearance

The brick wall will match the other structures on the A6MARR.

SPT has advised that environmental impact issues for the A6MARR will be dealt with by environmental consultant, Mouchel.

This small retaining wall when considered as an individual entity will have minimal visual impact when considering the rest of the construction work undertaken in the local vicinity.

Appendix A

List of Drawings

1007/3D/DF7/A6-MA/R002A/004

1007/3D/DF7/A6-MA/R009/726

1007/3D/DF7/A6-MA/R010/008

1007/3D/DF7/A6-MA/R011/009

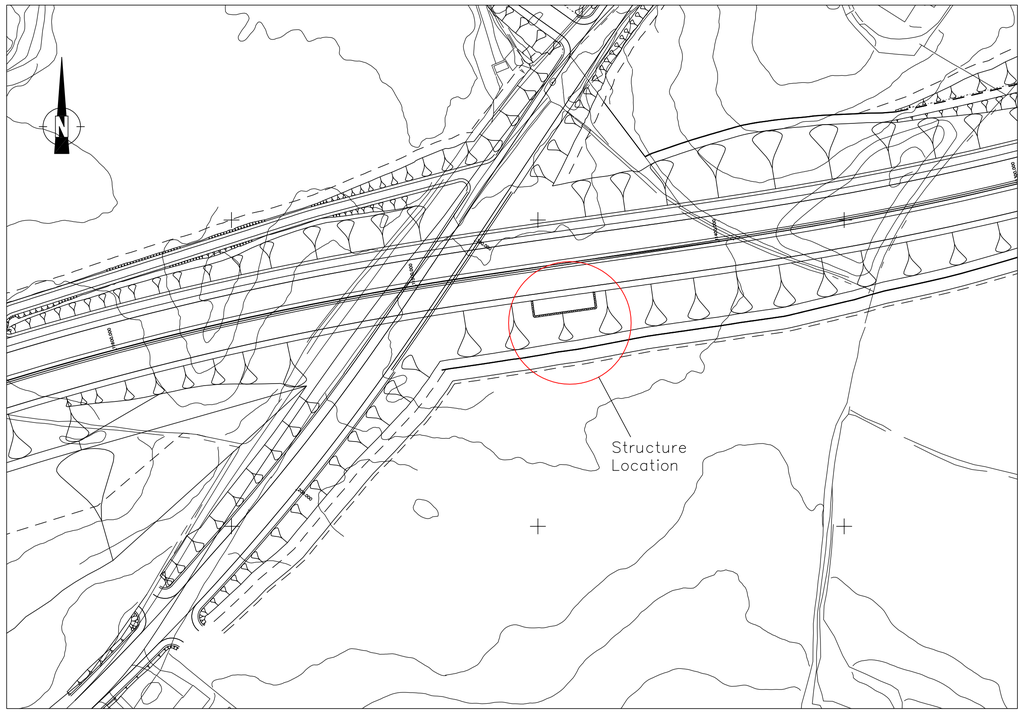
1007/3D/DF7/A6-MA/R016/729

1007/3D/DF7/A6-MA/TR1B/003

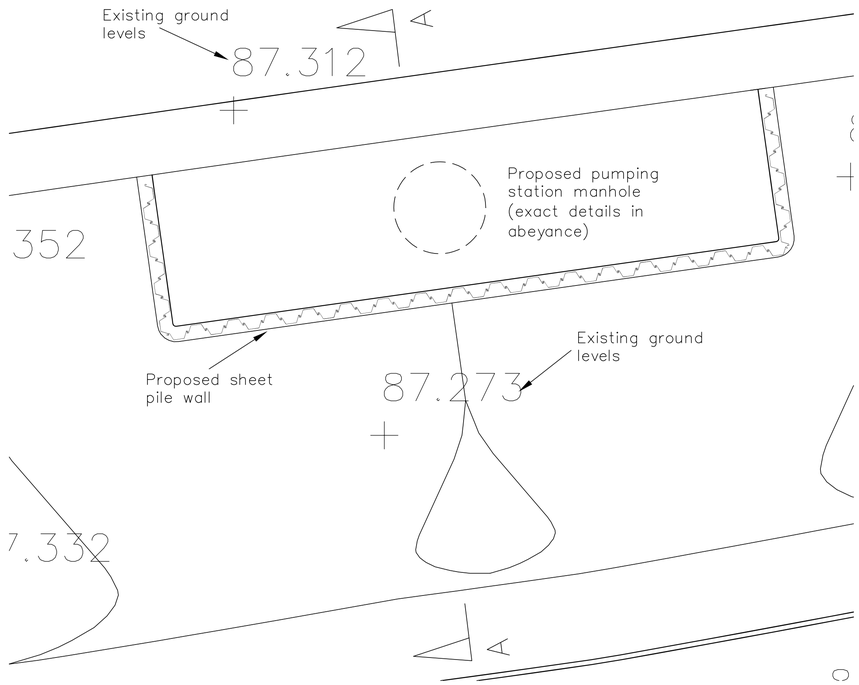
1007/3D/DF7/A6-MA/TR1G/006

1007/3D/DF7/A6-MA/TR1M/011

R002A Westbound

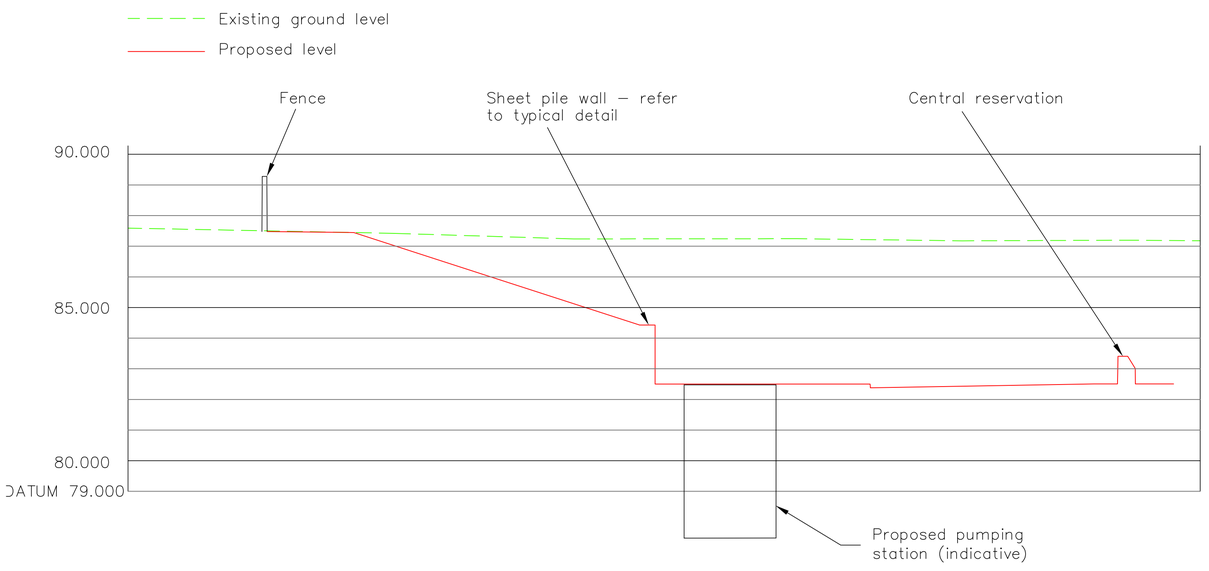


LOCATION PLAN
SCALE 1:1000

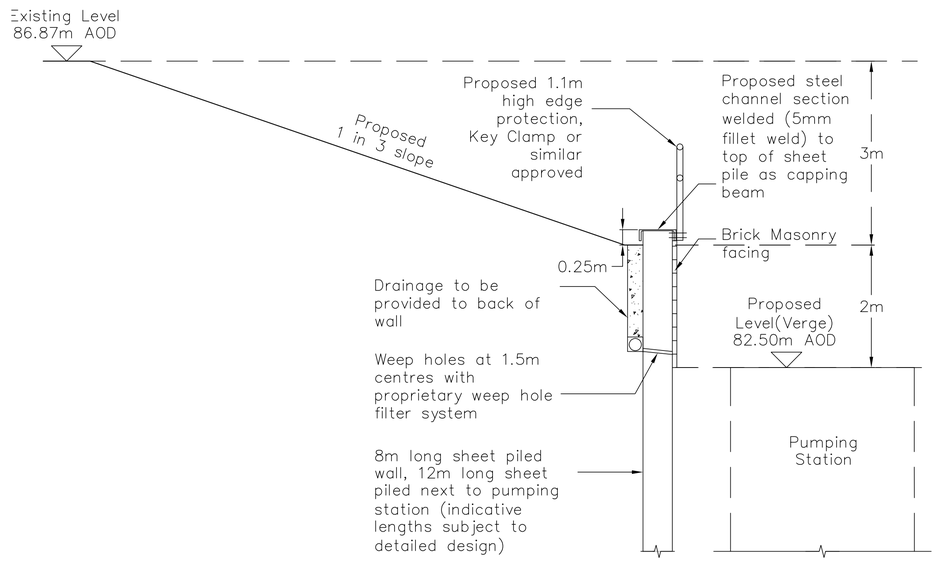


PLAN
SCALE 1:100

LENGTH OF WALL: 21m



SECTION A–A
SCALE 1:100



TYPICAL DETAIL OF SHEET PILED WALL
SCALE 1:20

NOTES:

1. This drawing has been produced based on the latest MX highway model – draft design freeze 7, as provided by the client.
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4. Levels are in meters and above ordinate datum.
5. All dimension are in millimeters
6. The option shown on this drawing is based on the latest available geotechnical information.
7. Basic preliminary design has been undertaken to determine the geometry of the section sizes as per client's instruction.

Rev.	Drawn	Checked	Date	Revision Details
A	DB	ME	11.09.13	Issued For Planning
–	DB	ME	30.08.13	First Issue

south east manchester multi modal strategy

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Job Title

A6 TO MANCHESTER AIRPORT RELIEF ROAD

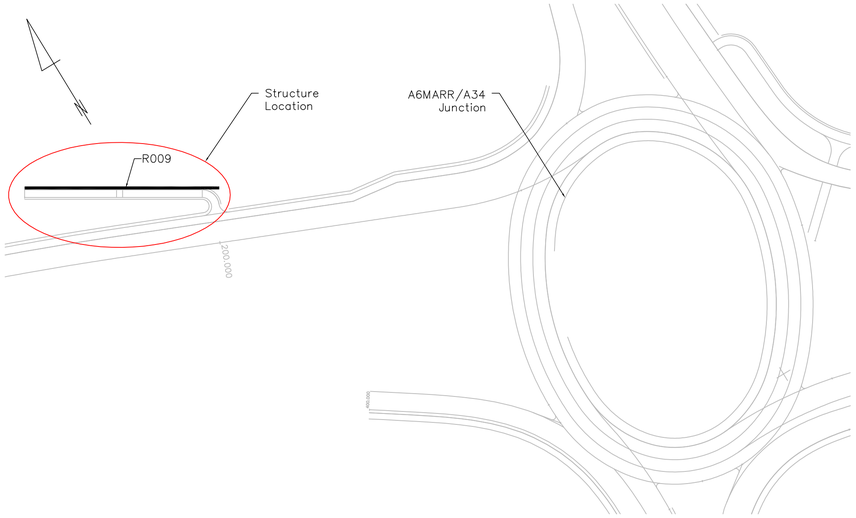
Drawing Title

RETAINING WALL R002A GENERAL ARRANGEMENT

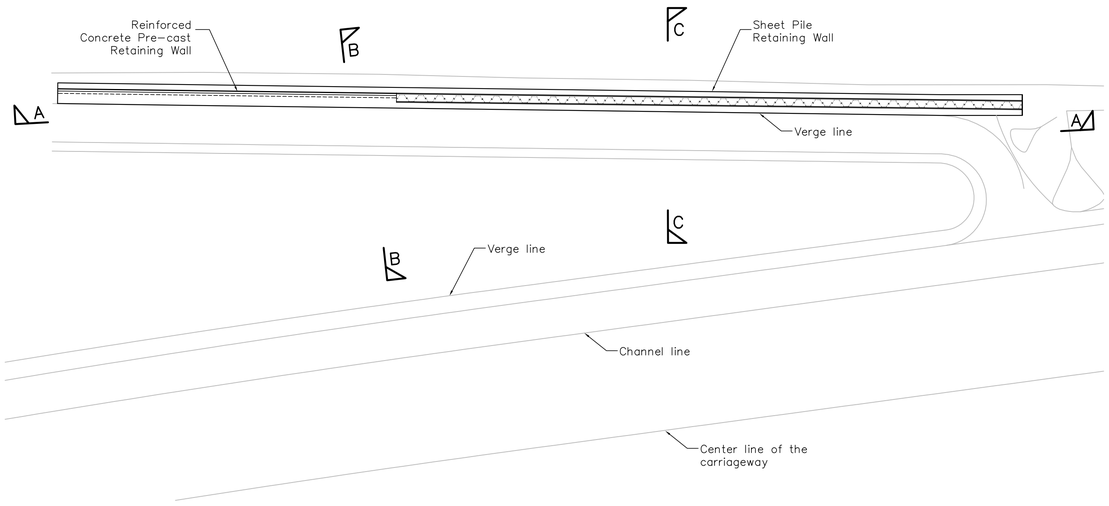
Drawn	Engineer	Checked	Approved
DB	DJ	ME	NS
Date AUG/13	Date AUG/13	Date AUG/13	Date SEP/13

Size	Scale
A1	AS SHOWN
SCG No. SCGNO	Filename
Drawing No. 1007/3D/DF7/A6-MA/R002A/004	Revision A

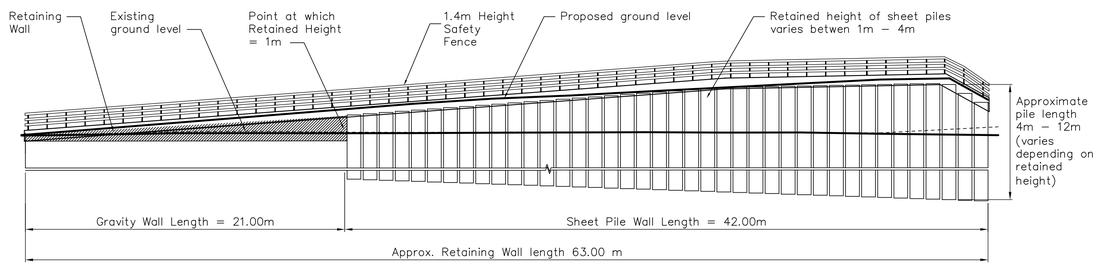
R009
Northbound



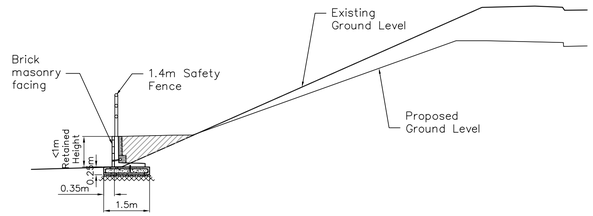
LOCATION PLAN
SCALE 1:1000



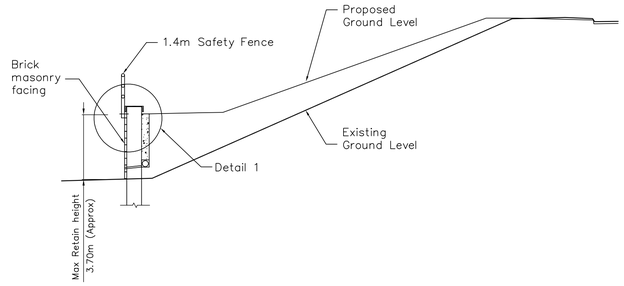
PLAN
SCALE 1:200



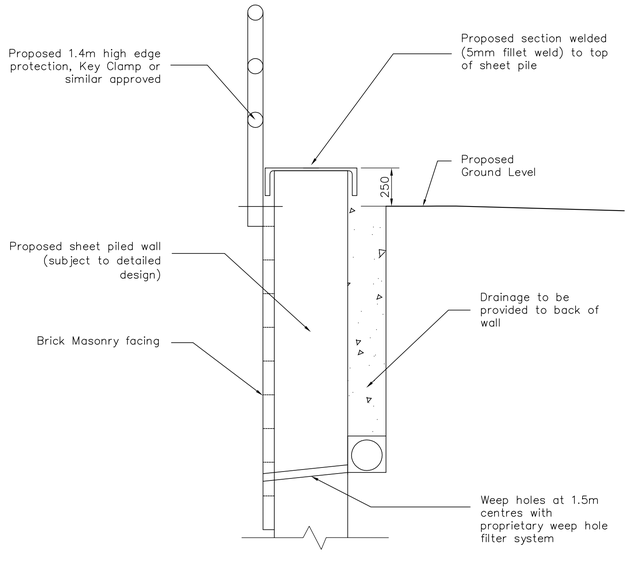
ELEVATION A–A
SCALE 1:200



SECTION B–B
SCALE 1:100



SECTION C–C
SCALE 1:100



DETAIL 1
SCALE 1:50

NOTES:

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Rev.	Drawn	Checked	Date	Revision Details
B	DB	ME	16.09.13	Issued for Planning
A	DB	ME	13.09.13	Issued for Planning
–	DB	ME	09.01.12	First Issue

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Job Title
A6 TO MANCHESTER AIRPORT RELIEF ROAD

Drawing Title
GENERAL ARRANGEMENT
R009
RETAINING WALL

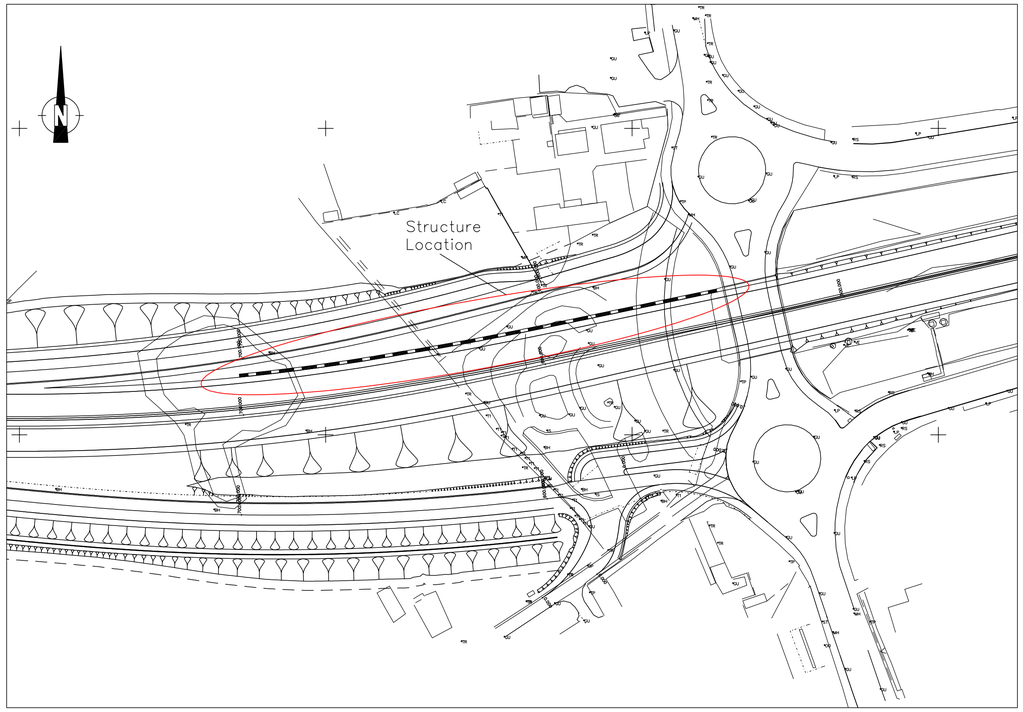
Drawn	Engineer	Checked	Approved
RBG	NA	TK	NS
Date	Date	Date	Date
SEP/13	SEP/13	SEP/13	SEP/13

Size	Scale
A1	AS SHOWN

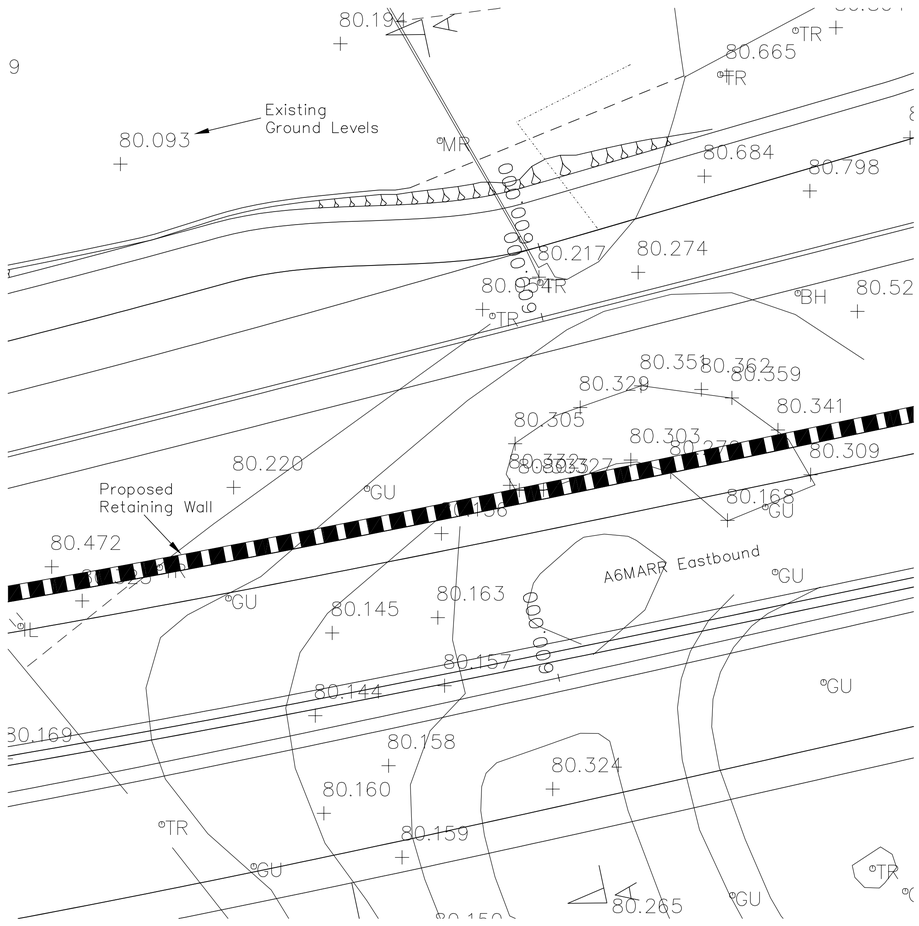
SCG No.	Filename
SCGNO	DRAWINGLOCATION DRAWINGLOCATION

Drawing No.	Revision
1007/3D/DF7/A6–MA/R009/726	B

R010 Eastbound

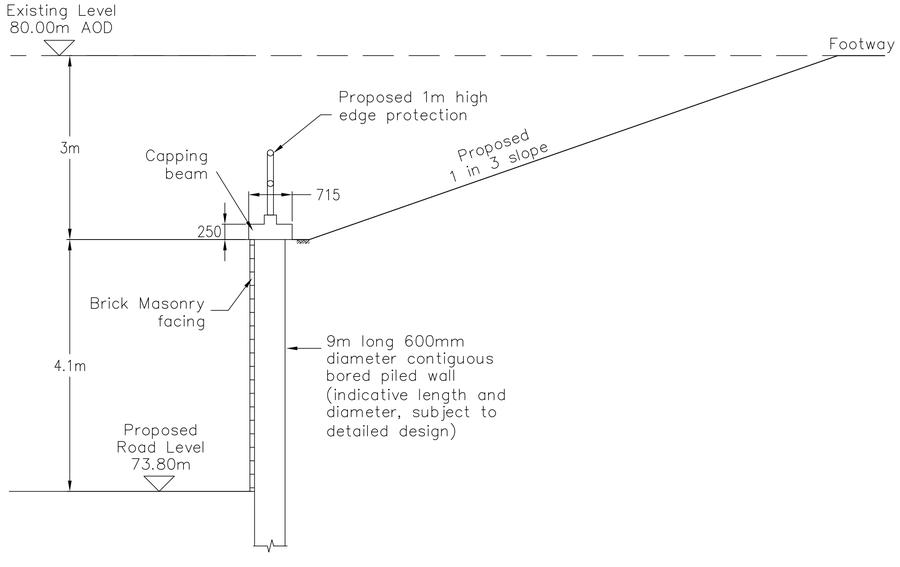


LOCATION PLAN
SCALE 1:1000

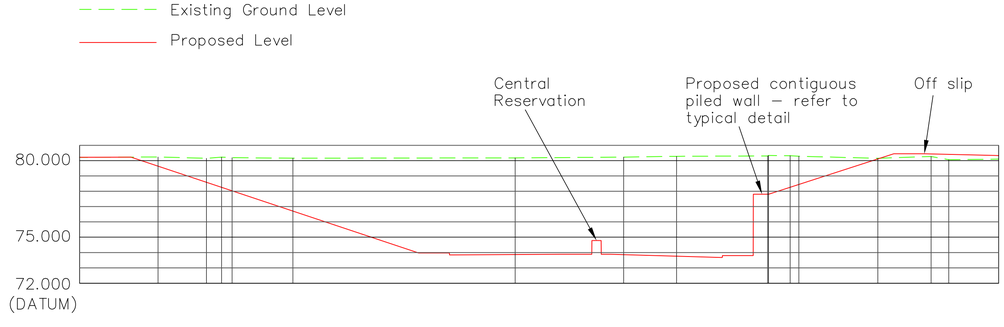


PLAN
SCALE 1:200

LENGTH OF WALL: 160m



DETAIL
SCALE 1:50



SECTION A–A
SCALE 1:200

NOTES:

1. This drawing has been produced based on the latest MX highway model – Draft Design Freeze 7, as provided by the client.
2. This drawing has been produced mainly for the purpose of planning application.
3. Only one option has been considered for this location as per client's instructions.
4. Levels are in meters and above Ordinate Datum.
5. All dimension are in millimeters.
6. The option shown on this drawing is based on the latest available geotechnical information.
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Rev.	Drawn	Checked	Date	Revision Details
A	DB	ME	13.09.13	Issued for Planning
–	DB	ME	30.08.13	First Issue

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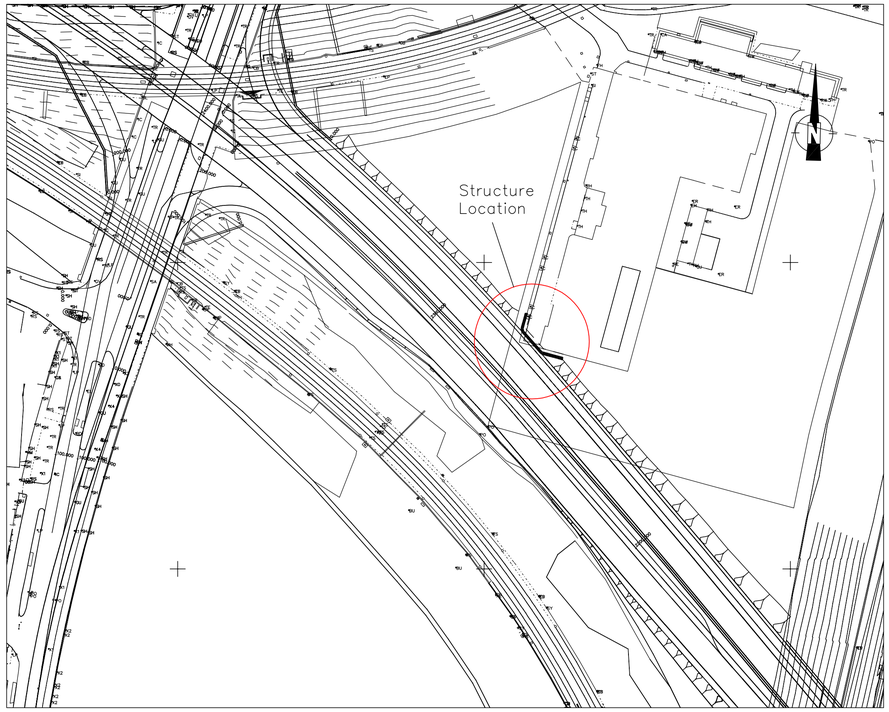
Job Title
A6 TO MANCHESTER AIRPORT RELIEF ROAD

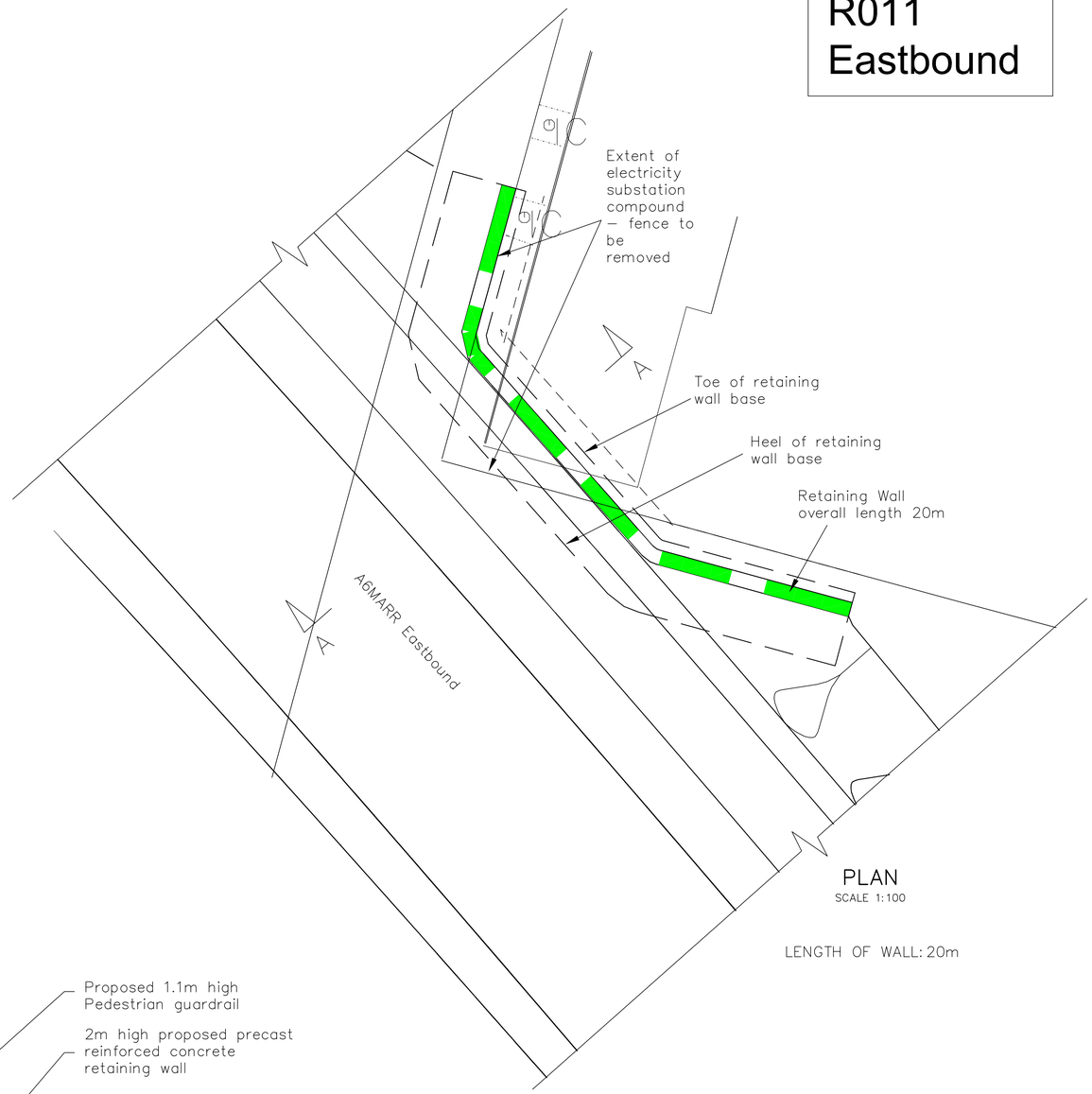
Drawing Title
RETAINING WALL R010 GENERAL ARRANGEMENT

Drawn	Engineer	Checked	Approved
DB	DJ	ME	NS
Date	Date	Date	Date
AUG/13	AUG/13	AUG/13	SEP/13
Size	Scale		
A1	AS SHOWN		
SCG No.	Filename		
SCGNO			
Drawing No.			Revision
1007/3D/DF7/A6–MA/R010/008			A



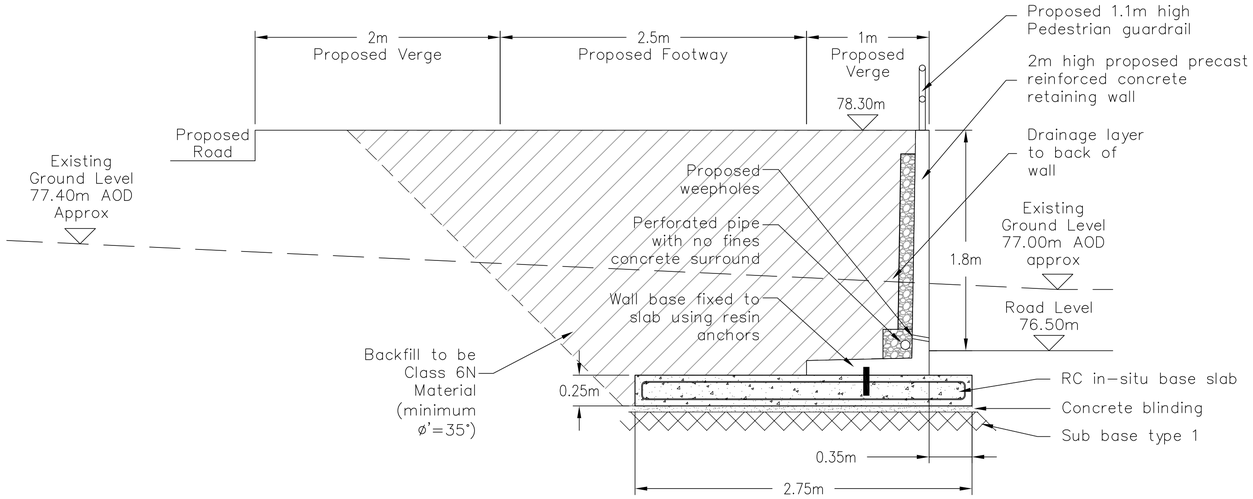
LOCATION PLAN
SCALE 1:1000

R011 Eastbound



PLAN
SCALE 1:100

LENGTH OF WALL: 20m



SECTION A–A
SCALE 1:50

NOTES:

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Rev.	Drawn	Checked	Date	Revision Details
A	DB	ME	13.09.13	Issued For Planning
–	DB	ME	30.08.13	First Issue

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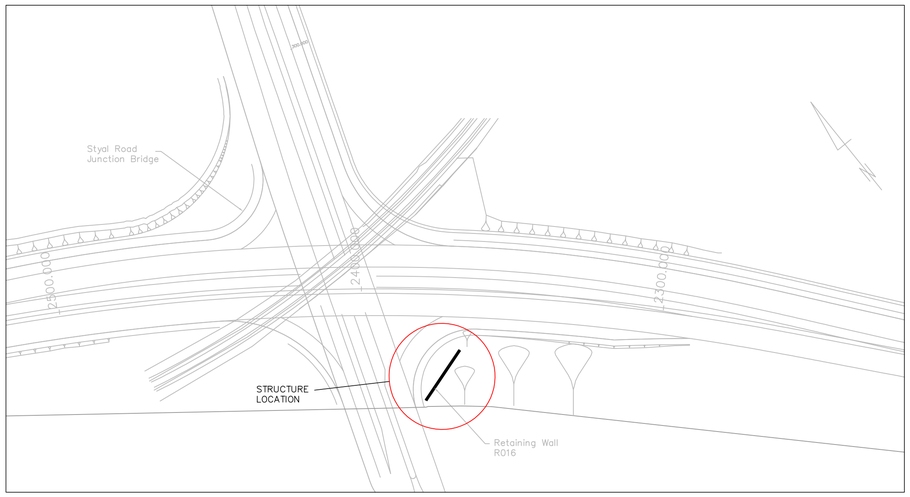
Job Title
A6 TO MANCHESTER AIRPORT RELIEF ROAD

Drawing Title
RETAINING WALL R011 GENERAL ARRANGEMENT

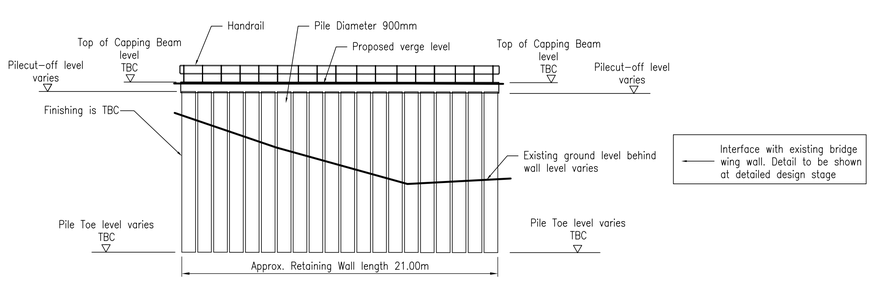
Drawn	Engineer	Checked	Approved
DB	DJ	NB	NS
Date	Date	Date	Date
AUG/13	AUG/13	AUG/13	SEP/13

Size	Scale
A1	AS SHOWN
SCG No.	Filename
SCGNO	

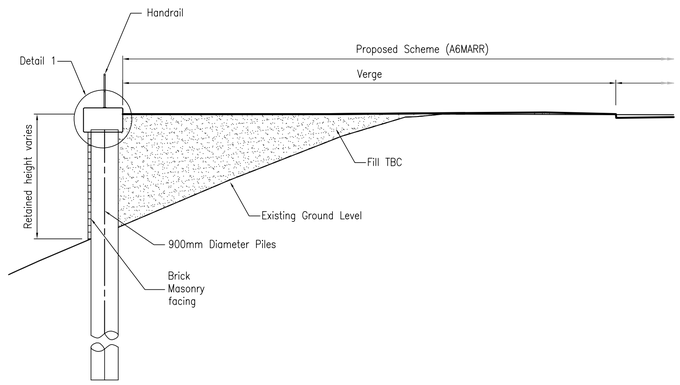
Drawing No. 1007/3D/DF7/A6-MA/R011/009
Revision A



LOCATION PLAN
SCALE 1:1000

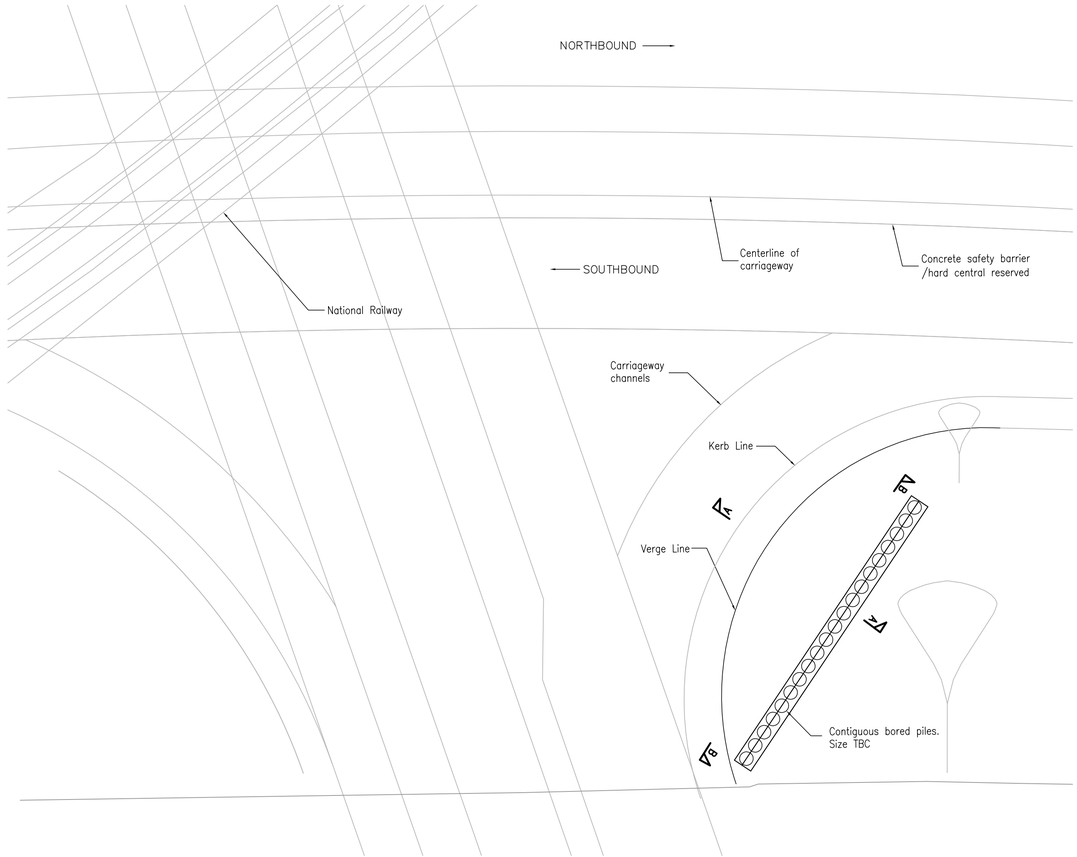


ELEVATION B–B
SCALE 1:200

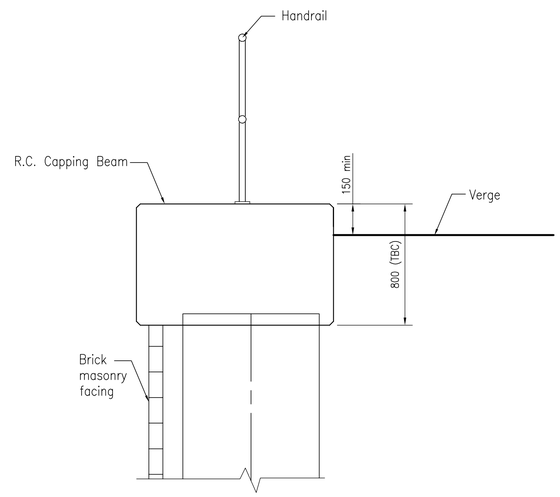


SECTION A–A
SCALE 1:100

R016
Southbound



PLAN
SCALE 1:200



DETAIL 1
SCALE 1:50

NOTES:

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6. The option shown on this drawing is based on the latest available geotechnical information.
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Rev.	Drawn	Checked	Date	Revision Details
B	DB	ME	13.09.13	Issued for Planning
A	DB	ME	09.01.12	First Issue

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Job Title
A6 TO MANCHESTER AIRPORT RELIEF ROAD

Drawing Title
GENERAL ARRANGEMENT R016 RETAINING WALL

Drawn	Engineer	Checked	Approved
RBG	NA	TK	NS
Date	Date	Date	Date
DEC/11	DATE	DATE	DATE

Size	Scale
A1	AS SHOWN

SCG No.	Filename
SCGNO	DRAWINGLOCATION DRAWINGLOCATION

Drawing No.	Revision
1007/3D/DF5/A6-MA/R016/729	B

TR1B

NOTES:

1. This drawing has been produced based on the latest MX highway model – Draft Design Freeze 7, as provided by the client.
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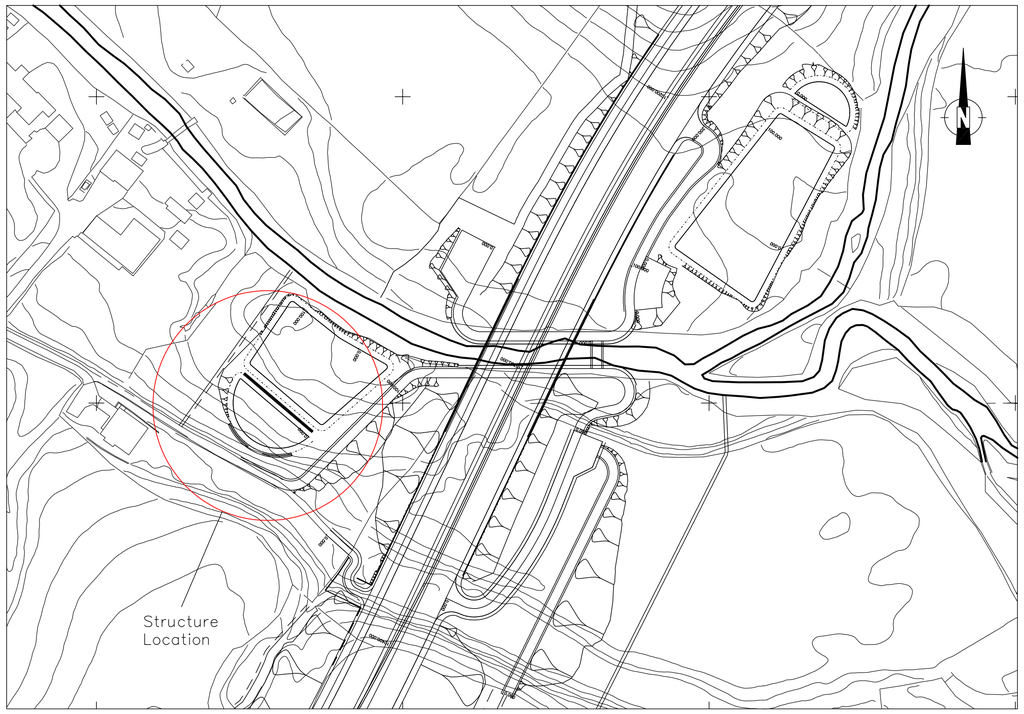
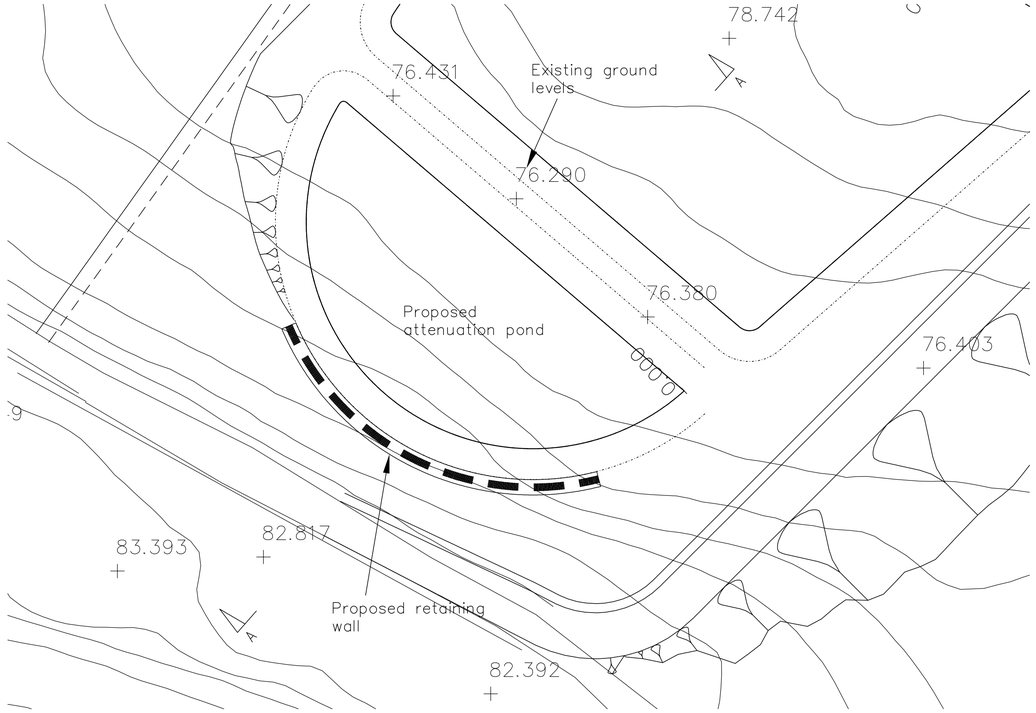
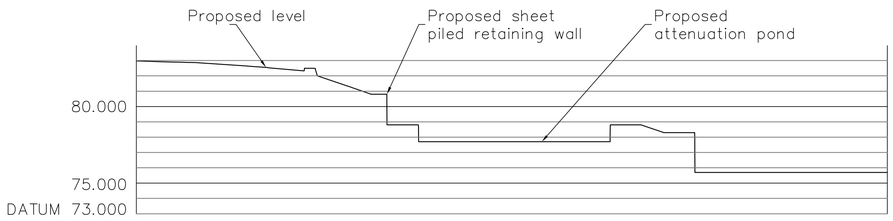


LOCATION PLAN
SCALE 1:1000

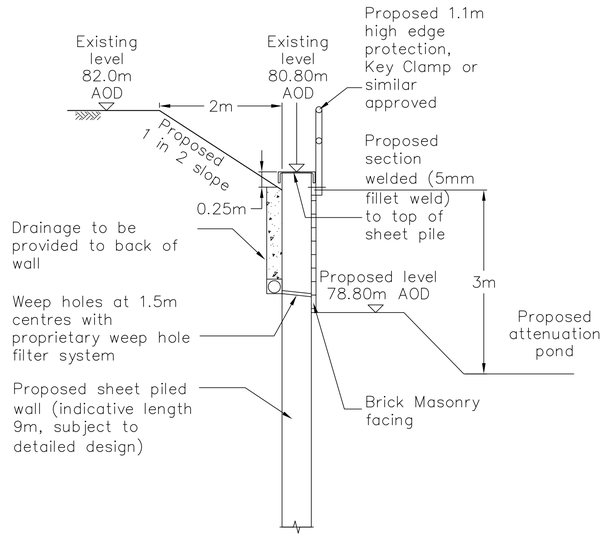


PLAN
SCALE 1:200

LENGTH OF WALL: 21m



SECTION A–A
SCALE 1:200



TYPICAL DETAIL OF SHEET PILED WALL
SCALE 1:20

Rev.	Drawn	Checked	Date	Revision Details
A	DB	ME	13.09.13	Issued for Planning
–	DB	ME	30.08.13	First Issue

south east manchester multi modal strategy

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Job Title

A6 TO MANCHESTER AIRPORT RELIEF ROAD

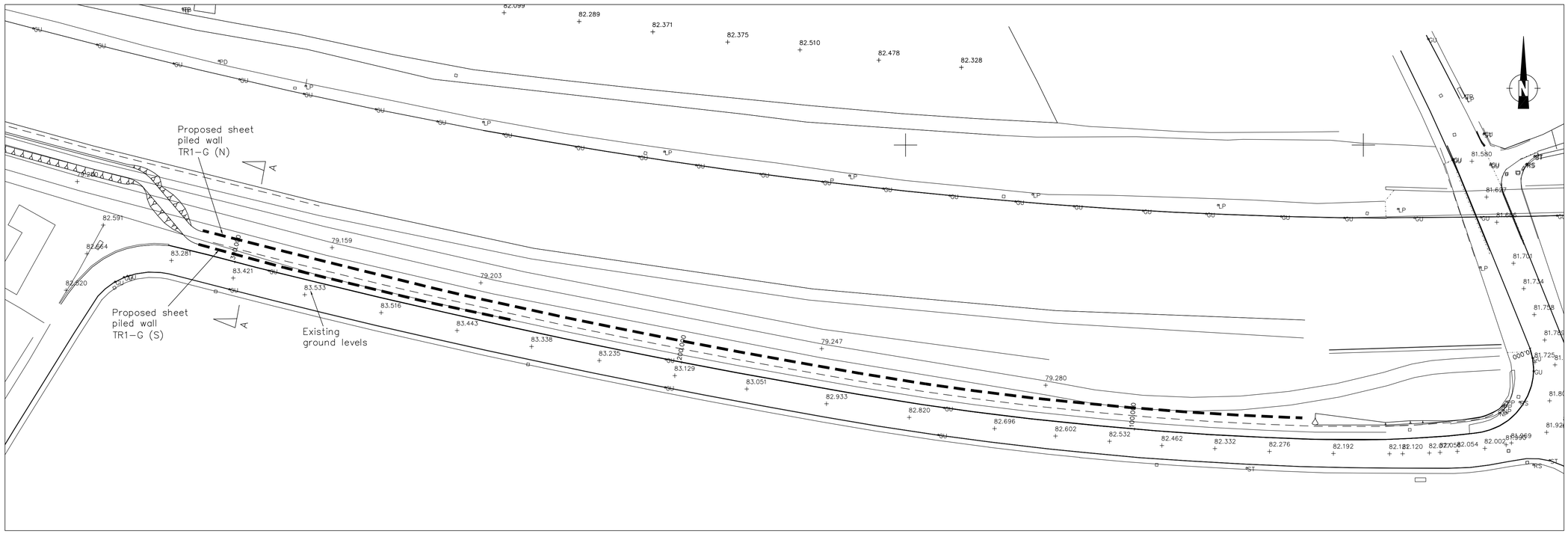
Drawing Title

RETAINING WALL TR1B
GENERAL ARRANGEMENT

Drawn	Engineer	Checked	Approved
DB	DJ	ME	NS
Date	Date	Date	Date
AUG/13	AUG/13	AUG/13	SEP/13

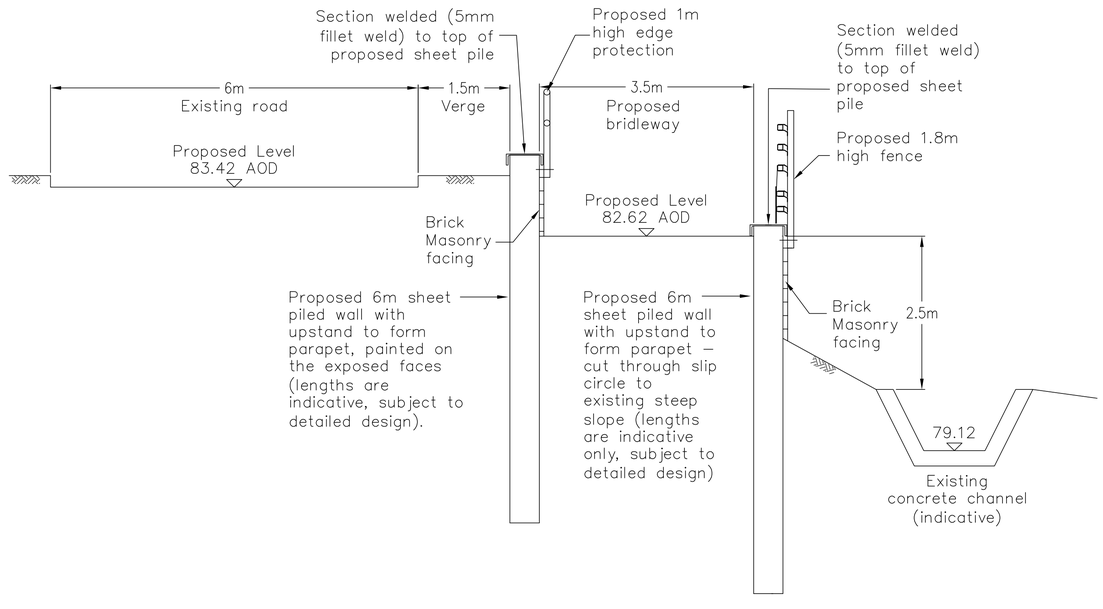
Size	Scale
A1	AS SHOWN
SCG No.	Filename
SCGNO	
Drawing No.	Revision
1007/3D/DF7/A6–MA/TR1B/003	A

TR1G Eastbound



PLAN
SCALE 1:500

APPROXIMATE LENGTH OF WALL TR1–G (N): 244m
APPROXIMATE LENGTH OF WALL TR1–G (S): 70m



SECTION A–A
SCALE 1:50

NOTES:

1. This drawing has been produced based on the latest MX highway model – Draft Design Freeze 7, as provided by the client.
2. This drawing has been produced mainly for the purpose of planning application.
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Rev.	Drawn	Checked	Date	Revision Details
A	DB	ME	13.09.13	Issued for Planning
–	DB	ME	30.08.13	First Issue

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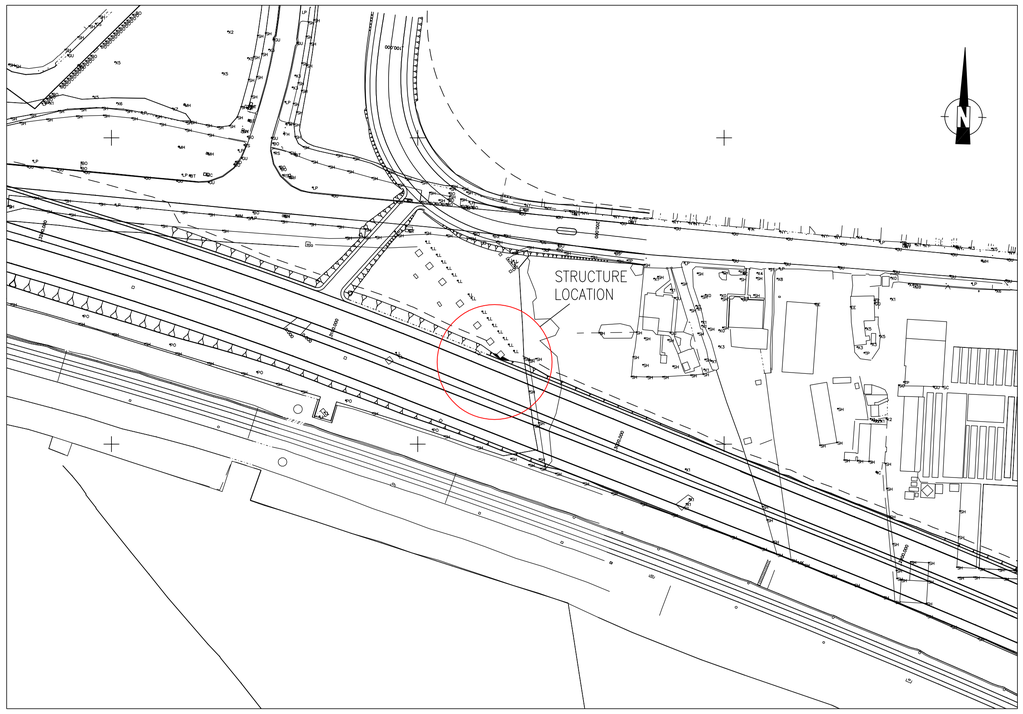
Job Title
A6 TO MANCHESTER AIRPORT RELIEF ROAD

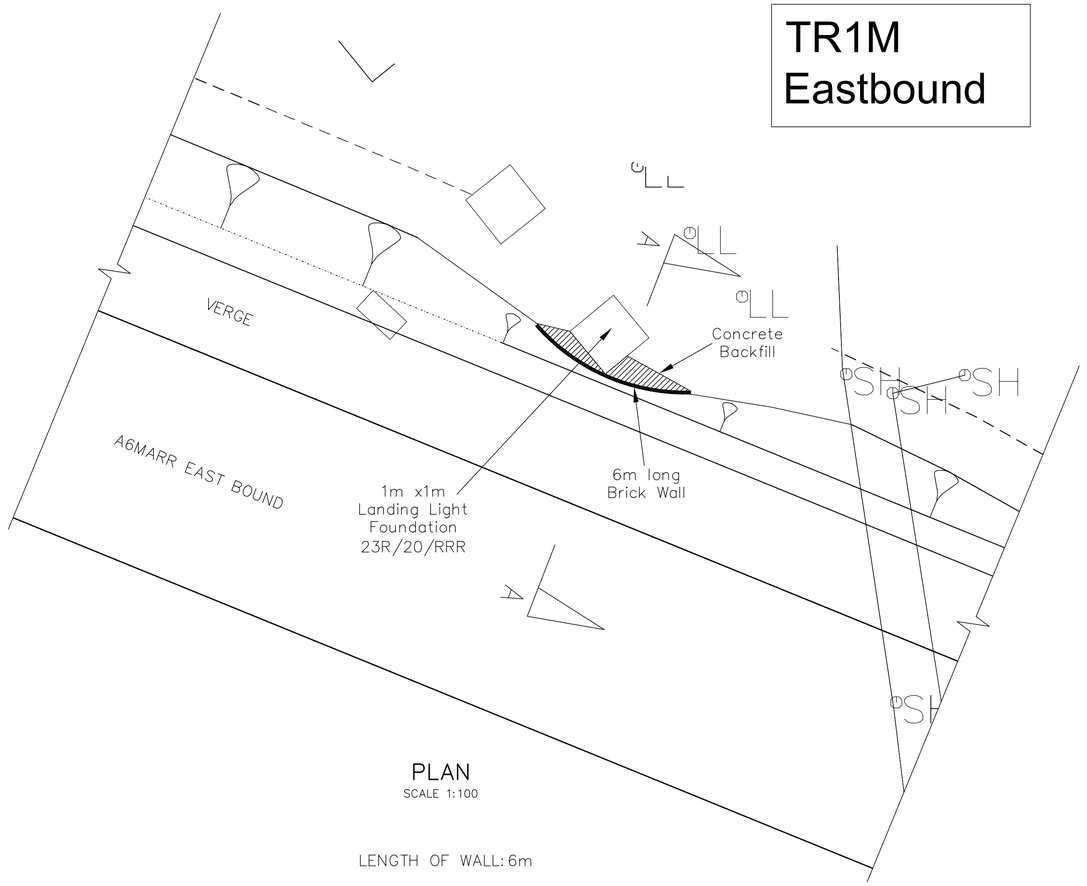
Drawing Title
RETAINING WALL TR1G GENERAL ARRANGEMENT

Drawn	Engineer	Checked	Approved
DB	DJ	ME	NS
Date AUG/13	Date AUG/13	Date AUG/13	Date SEP/13
Size A1	Scale AS SHOWN		
SCG No. SCGNO	Filename		
Drawing No. 1007/3D/DF7/A6–MA/TR1G/006			Revision A



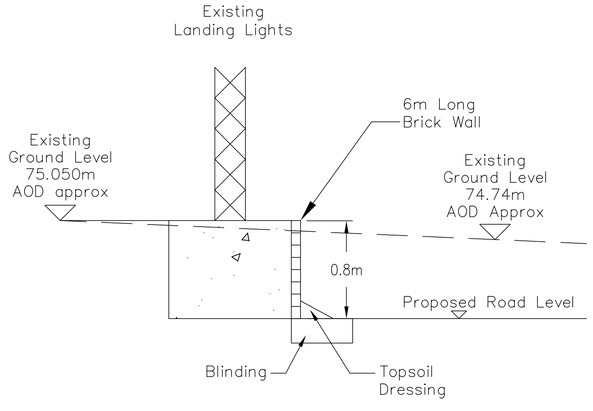
LOCATION PLAN
SCALE 1:1000

TR1M Eastbound



PLAN
SCALE 1:100

LENGTH OF WALL: 6m



SECTION A–A
SCALE 1:25

NOTES:

1. This drawing has been produced based on the latest MX highway model – Draft Design Freeze 7, as provided by the client.
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Rev.	Drawn	Checked	Date	Revision Details
A	DB	ME	13.09.13	Issued for Planning
–	DB	ME	30.08.13	First Issue

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Job Title

A6 TO MANCHESTER AIRPORT RELIEF ROAD

Drawing Title

RETAINING WALL TR1M GENERAL ARRANGEMENT

Drawn	Engineer	Checked	Approved
DB	DJ	NB	NS
Date AUG/13	Date AUG/13	Date AUG/13	Date SEP/13
Size A1	Scale AS SHOWN		
SCG No. SCGNO	Filename		
Drawing No. 1007/3D/DF7/A6-MA/TR1M/011			Revision A