

**APPLICATION FOR A LAWFUL DEVELOPMENT CERTIFICATE FOR PROPOSED USE  
OR DEVELOPMENT IN RELATION TO THE DUAL TRACKING OF THE METRO  
RAILWAY BETWEEN PELAW AND JARROW STATIONS (“THE PROJECT”)**

**SUPPORTING TECHNICAL NOTE**

**APPENDIX 2**

## Fence Line and Vegetation Technical Note

### 1. Existing Asset

At present the railway corridor is contained within a fenced boundary.

The existing vegetation is overgrown in places with some trees close to the overhead line and tracks.

### 2. Proposed Asset and reason for the change

As part of the proposed works in general there will need to be vegetation clearance and tree removal within 2m of the tracks to enable safe sighting distances and ensure there is nothing overhanging the track and Overhead Line.

Other vegetation clearance may be required up to the existing fence line in some areas to facilitate the introduction of construction track access via compounds or direct track access from a roadway. In these sections, fence panels/lines will be removed and replaced with gateways during construction. Unless required after construction for on-going operational maintenance, these gateways would be replaced by a secure fence panel. Appropriate replanting of vegetation may take place in these areas.

Depending on the detailed design there may also need to be some Anti-climb panels introduced in replacement for existing panels or additionally, depending on risk assessments.

### 3. Proposed Development

#### 3.1. Design, including applicable standards

Any works will be designed to British and European standards.

If required any additional fencing will be 2.1m Palisade Fencing, as installed around the rest of the Metro System.

#### 3.2. Quantum

The quantum of materials is addressed in the Main Document in Section 4 under the heading of "Materials and Construction Activity".

#### 3.3. Scale – upper and outer dimensions and possible change to the existing asset.

The scale of the asset will only increase in discrete locations to abide with safety standards, the height of which will be determined through risk assessment during detailed design.

Standard height is 2.1m, but may increase to up to 3m for short sections.

#### 3.4. Layout – separation/size

There will be no material change to the general layout of the asset, which will follow the existing operational boundary of the site.

### 4. Possible variation/ micro-siting

There may be minor changes due to the detail design.

### 5. Possible Installation methods

Vegetation will be cleared using Flails, Chainsaws and standard Tree Surgeon equipment.

Standard installation method for fencing is a small concrete post foundation, the panels may then be lifted in using small plant.

## Permanent Way and Switches and Crossings Technical Note

### 1. Existing Asset

The existing track layout in this section currently contains both Network Rail and Nexus Tracks.

The Network Rail track is a single line bi-directional layout between Pelaw Junction and the Prax terminal. The Nexus track layout is a combination of single line bi-directional and dual track layouts.

This means that there are currently always two adjacent lines throughout this section and in two areas there are three.

### 2. Proposed Asset and reason for the change

The proposed scheme will combine the tracks from the two networks, create a single dual track layout throughout.

The proposed track layout will be owned and managed by Nexus with Freight trains running between Passenger trains.

The change will remove the sections where at present there are three adjacent tracks. This will require the replacement of the existing Switches and Crossings and in cases the location will change.

The Proposed Works will therefore include the removal of some sections of existing track and the laying of new track and associated switches including sections of new crossovers as shown on the following drawings.

**10033113-ARC-XX-DU-RP-TR-000004**

**10033113-ARC-XX-DU-RP-TR-000005**

**10033113-ARC-XX-DU-RP-TR-000006**

### 3. Proposed Development

#### 3.1. Design, including applicable standards

Any works will be designed to Nexus, British and European standards.

#### 3.2. Quantum

The quantum of materials is addressed in the Main Document in Section 4 under the heading of "Materials and Construction Activity".

#### 3.3. Scale – upper and outer dimensions and possible change to the existing asset.

The track will not be completely renewed throughout the site, instead there are five locations throughout the site where the track will be renewed and six where new switches and crossings will be installed.

Of the five renewal locations, in three both tracks will be renewed. Between these renewal sites the track will be realigned using a process called Tip, Ballast, Tamp and Stress.

There will be no change to the scale of the asset.

#### 3.4. Layout – separation/size

Though in some sections there are proposed realignments to improve the ride quality and meet standards, this change will not visually be noticeable from the track boundary. The

main visual change will be the removal of the sections with three adjacent tracks and the movement of points and crossings.

#### **4. Possible variation/ micro-siting**

Through the detailed design process the extent of the renewal sections may vary and the alignment adjusted. However the final installation will have the same appearance.

#### **5. Possible Installation methods**

The works will be installed using a variety of on-track plant. Due to the limits of the Nexus system the available installation methods for both Plain Line and Switches and Crossing is quite limited and over the past ten years a standard procedure has evolved.

Though no large-scale high output machines will be utilised the following plant will be used, depending on the contractor's methodology:

- Rail Mounted Excavators – these may be of varying size and number throughout the works. They are utilised throughout the process to remove spoil, pour ballast and lift sleepers and rail.
- Mini digger Excavators – these will be used off track to carry out small scale works.
- Engineering Trains – to improve outputs it is hoped that part of the Network Rail engineering train fleet can be utilised during the works to deliver materials and remove spoil. If unavailable Unimog trains will be utilised
- Rail mounted Unimogs with trailers – either in conjunction with or instead of Unimog trains will be created using a Unimog with up to 12 trailers. These will transport spoil and materials from the compounds to the works locations
- Dozers – these are used to grade the foundation and the ballast to the design levels
- Tampers – tampers carry out the micro adjustment to place the track to the design alignment.

## Earthworks Technical Note

### 1. Existing Asset

The existing earthworks through this section of track are earth embankments and cuttings have been in-situ for over 40 years and were constructed prior to the Metro opening.

### 2. Proposed Asset and reason for the change

In order to avoid largescale bridge reconstructions there are four proposed track lowers of varying lengths. These lowers vary in depth and some may require small scale earthworks to support the toe of embankments to prevent collapse.

### 3. Proposed Development

#### 3.1. Design, including applicable standards

Any earthworks will be designed to British and European standards.

#### 3.2. Quantum

The quantum of materials are being addressed in the Main Document in Section 4 under the heading of "Materials and Construction Activity".

#### 3.3. Scale – upper and outer dimensions and possible change to the existing asset.

As shown on the following Form A drawings:

**1003313-ARC-XX-00-DR-CE-70011 to 1003313-ARC-XX-00-DR-CE-70040**

The following groupings of earthworks have been identified:

- Track slews greater than 150mm, hatched in green.
- Track lowers up to 150mm, hatched in yellow
- Track lowers greater than 300mm, hatched in red.

There are four locations where the track lowers are greater, up to around 600mm.

At Form A stage nine areas<sup>1</sup> have been identified that are likely to require earthworks, these are detailed on the Civils drawings. The current total length of earthworks on this scheme is 1600m. This is considered to be a realistic worst case - the exact extent of lowering at detailed design will be dependent upon a number of factors including the Permanent Way design, outcome of ground investigation and the availability of lateral support within the current operational boundary, which will be the responsibility of the appointed contractor and who can reasonably be expected to seek to undertake value engineering as part of the final design process.

#### 3.4. Layout – separation/size

The location and length of each proposed earthworks location varies from 30m to 630m and are spread out throughout the scheme - as indicated on the Civil Drawings.

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<sup>1</sup> To note in practise where locations are adjacent or close to each other the earthworks would be connected through, these have therefore been counted as one area.

#### **4. Possible variation/ micro-siting**

The exact chainages of the earthworks is dependent on the Permanent Way design and ground conditions following further ground investigations.

The final design may vary from the Form A design, with start and finish locations moving up to approximately 50m laterally, however it is likely that the overall quantum of earthworks will decrease (on those assumed at this stage) through the detailed design phase as part of value engineering. As a consequence, the quantum and scale of works described above are considered to be realistic worst case.

##### **4.1.1. Track Slews**

Though the track slews (track realignments) are unlikely to require earthworks, there is a possibility that during the detailed design phase the need for ballast retention may be identified or the requirement to create safe walking routes and areas of safety.

##### **4.1.2. Track Lowers**

It is hoped that during detailed design by the appointed contractor some of the track lowers will either be designed out or found to not require earthworks.

It may be found however that in the location which require larger lowers that sheet pile wall may need to be installed.

#### **5. Possible Installation methods**

In the majority of instances, installation methods are likely to be either Ruglei for ballast retention or Kingpost to support the toe of the embankment. Of the locations where the track lowers are greater (up to around 600mm) it is envisaged that a King Post system would be installed, sheet piles may be required.

Both of these systems have been successfully installed across the Metro system and to a larger extent nationally. Examples are Ruglei in various areas in North Tyneside and King Post between Jesmond and South Gosforth.

All systems will need piles of varying lengths installing for king post and Ruglei systems this can be carried out using a rail mounted excavator with an attachment.

If sheet piles are required a specialist piling machine will be required, depending on the length of the piles a crane may also be required.

# Track Drainage Technical Note

## 1. Existing Asset

There are two types of track drainage:

- Positive track drainage, which uses pipework and connects into the local drainage system.
- Negative track drainage, which is Sustainable Drainage system (SUDs) and utilises the natural drainage of the land.

Within this section of track there are currently both systems and at present are no flooding issues.

The existing track drainage system outfalls into the local drainage system at approved locations.

## 2. Proposed Asset and reason for the change

Due to the change in the track profile the drainage need has changed. The proposed design includes the replacement of the existing drainage system and utilises the existing outfalls.

Where possible negative drainage will be utilised.

The proposed track drainage is identified on the following permanent way drawings.

**10033113-ARC-XX-DU-RP-TR-000004**

**10033113-ARC-XX-DU-RP-TR-000005**

**10033113-ARC-XX-DU-RP-TR-000006**

## 3. Proposed Development

### 3.1. Design, including applicable standards

Any works will be designed to British and European standards.

### 3.2. Quantum

The quantum of materials is addressed in the Main Document in Section 4 under the heading of "Materials and Construction Activity".

### 3.3. Scale – upper and outer dimensions and possible change to the existing asset.

The current discharge rates will be maintained as part of the design. It is unlikely, but where necessary attenuation will be used.

### 3.4. Layout – separation/size

The current drainage layout will be altered as part of the design and is likely to be further revised at detailed design.

## 4. Possible variation/ micro-siting

The drainage design is likely to be further revised at detailed design to reflect other changes in design and requirements of the Proposed Works following/as part of site investigation and value engineering.

## 5. Possible Installation methods

The track drainage will be installed as part of the track installation and utilise the plant and machinery used for the Proposed Works.

## Overhead Line Technical Note

### 1. Existing Asset

Existing Overhead Line is installed throughout this section of track over the current Metro lines only. At present the Overhead Line has a target wire height of 3.8m above the track with masts at a maximum of 65m centres in straight sections and at a shorter spacing through curves.

There are two areas where at present there is only a single line of overhead line masts.

The existing Overhead Lines will be removed.

### 2. Proposed Asset and reason for the change

The Overhead Lines will be replaced with new Overhead Lines on both lines.

The three main changes for the overhead line system are:

- There will now be overhead line over two tracks throughout this section of track
- The wire will be slightly higher with a target wire height of 4.5m to allow for the passage of the larger freight train beneath the wires.
- The new Overhead Line will be a safer double insulated system, which reduces the electrical envelope around the system.

Due to the increased wire height the new masts will also be higher.

### 3. Proposed Development

#### 3.1. Design, including applicable standards

Any works will be designed to British and European standards.

The Overhead line will be installed in accordance with Network Rail Standard RIE/PS/GEN/0007 and spaced using Nexus Standard POHL.FNA.CALCS.0003.

#### 3.2. Quantum

The quantum of materials is addressed in the Main Document in Section 4 under the heading of "Materials and Construction Activity".

#### 3.3. Scale – upper and outer dimensions and possible change to the existing asset.

The change in scale will be the introduction of a dual Overhead Line system throughout the section.

Due to improved safe standards and the increased wire height the existing masts have been surveyed and there will be new masts required in four areas:

- 2 areas both lines require new masts, totalling 1900m
- 3 areas only the existing outline overhead line requires replacing, totalling 700m
- 1 area only requires new masts on the in line, totalling 1100m.

There are also 30 tensioning points to meet current overhead line standards.

Masts and wires will be at a target height of 4.5m.

The extents for the works are detailed on the following drawings:

1003313-ARC-00-XX-DR-OL-10009 to 1003313-ARC-00-XX-DR-OL-10013



#### 3.4. Layout – separation/size

The majority of the masts will increase in size, though they will remain spaced to the same standards as currently laid, the parameters being:

- Mast spacing at a maximum of 65m, decreased on curves
- With a maximum of 20 masts within a 950m tension length

#### 3.5. Possible variation/ micro-siting

The Overhead Line has been designed in accordance with the stated standards, to minimise the number of masts and ensure safety. Any micro-siting of Overhead Lines as shown on the drawings may be necessary due to site conditions and there may be minor changes due to the detail design.

### 4. **Possible Installation methods**

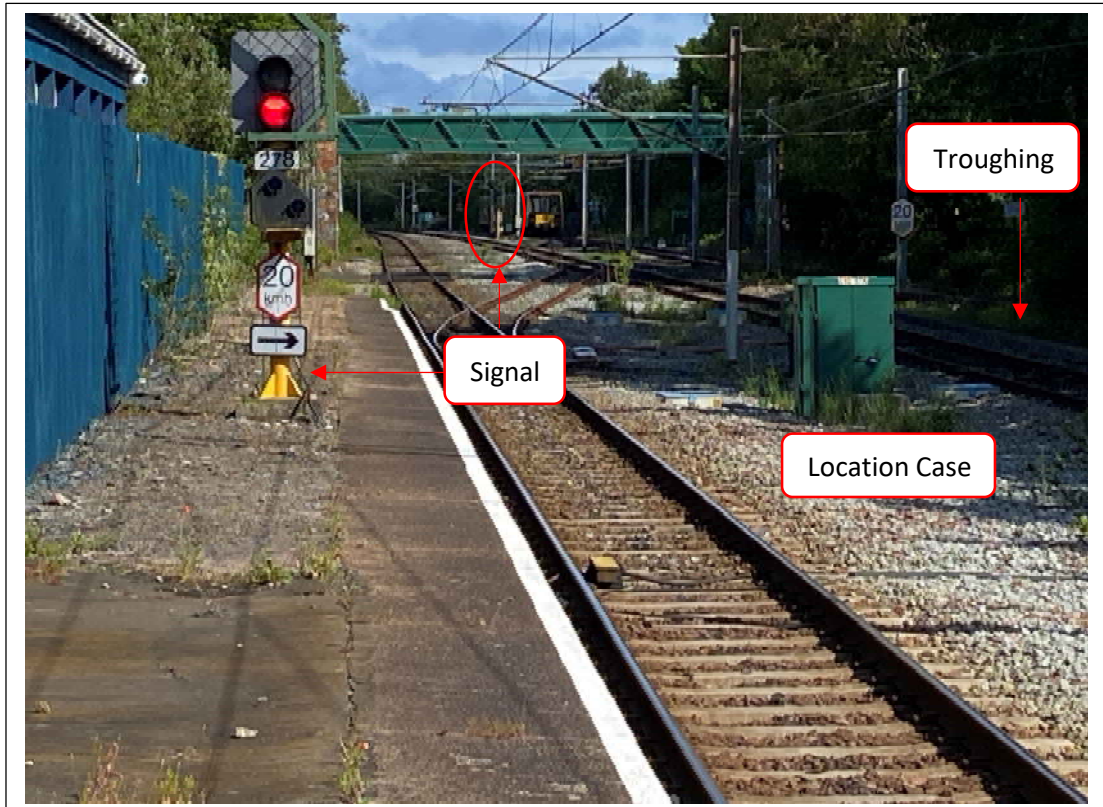
The overhead line masts will be installed using short piles, with a piling rig mounted on a rail mounted excavator. The overhead line will be installed using specialist equipment.

## Signalling Technical Note

### 1. Existing Asset

The Nexus Signalling system was installed when the Metro opened in the 1980s.

At present the existing system has 27 signals located throughout the area, which are connected via 29 location cases and cabling in trough routes.



*Representative image of assets*

### 2. Proposed Asset and reason for the change

Due to their age, the majority of the existing Location Cases will be replaced throughout the area with a modern unit that meets the Nexus Earthing Policy.

In summary to enable the proposed track alignment there will be the following changes to the Signalling system.

Number of signals to be recovered	21
Number of location cases to be recovered	19
Number of signals to be altered	6
Number of location cases to be altered	10
Number of proposed new signals	14
Number of proposed new location cases	21

In summary the proposed design will reduce the number of signals, but increase the number of Location Cases, this increase is largely due to changes to Signalling and Electrical standards.

### **3. Proposed Development**

#### **3.1. Design, including applicable standards**

Any works will be designed to British, European and Railway Group standards.

#### **3.2. Quantum**

The quantum of materials is addressed in the Main Document in Section 4 under the heading of "Materials and Construction Activity".

#### **3.3. Scale – upper and outer dimensions and possible change to the existing asset.**

The replacement signals and location cases will be of similar size and dimensions as the existing assets. Signals vary in height, due to sighting distances, but are normally up to 3.5m.

#### **3.4. Layout – separation/size**

The changes to the signalling can be found on the following signalling plans, note that green represents existing systems to be removed and red represents systems to be installed:

**1003313-ARC-00-XX-DU-MS-RS-000001 and 1003313-ARC-00-XX-DU-MS-RS-000002**

The locations of the new signals and location cases can be found on the following drawings:

**1003313-ARC-XX-00-DR-CE-70011 to 1003313-ARC-XX-00-DR-CE-70040**

#### **4. Possible variation/ micro-siting**

There may be changes to the signalling design during the detailed design phase, which will alter the location and layout of the signals and location cases, shown on drawings:

**1003313-ARC-XX-00-DR-CE-70011 to 1003313-ARC-XX-00-DR-CE-70040**

##### **4.1. Signals**

The final signal location will be subject to a signal sighting check.

##### **4.2. Location Cases**

The final location of the Location Cases will additionally be subject to the ground conditions.

#### **5. Possible Installation methods**

The location cases will have mass concrete foundations and need to be lifted into position on site.

The signal posts are likely to have mass concrete foundations, but the appointed contractor may choose to use small piled foundations.

Both operations will be carried out using rail mounted plant.

## Stations Technical Note

### 1. Existing Asset

Within this section of track, there are two existing stations, Hebburn and Jarrow, and both structures were built in the 1980s when the Metro was constructed.

Jarrow station has two separate adjacent platforms either side of the Metro Line, which are connected by a footbridge.

Hebburn station has two staggered platforms, which are located either side of Station Road Overbridge.

### 2. Proposed Asset and reason for the change

As part of the Proposed Works the stations will be refreshed and rebranded in line with the other stations on the Metro network, these changes will not change the layout or structure of the station.

The key change is the need to adjust or lower the platforms at the stations so that they are compliant with platform train interface requirements of the Rail Vehicle Accessibility Requirements (RVAR) legislation of a 65mm gap and a 50mm step.

During detailed design this may result in alterations to the other existing buildings and the possible reconstruction of canopy structures to ensure compliance with standards.

#### 2.1. Jarrow Station

In order to accommodate the track lowers through the station, minor alterations are needed to the existing platform edge and level. Due to the platform construction this may mean that the platform slab needs to be reconstructed. However, the final appearance will be very similar to the existing platform.

#### 2.2. Hebburn Station

Platform alterations are required through Hebburn Station for which two options are under consideration to be taken forward to detailed design by the contractor. The first would result in the lowering on the existing platform by around 300mm. Though the final appearance will be similar to the existing, to achieve the change in level the platform will need to be reconstructed.

There is an alternative engineering solution which would remove the need for a track lower, but require a change to the platform layout.

### 3. Proposed Development

#### 3.1. Design, including applicable standards

Any works will be designed to British and European standards.

#### 3.2. Quantum

The quantum of materials is addressed in the Main Document in Section 4 under the heading of "Materials and Construction Activity".

#### 3.3. Scale – upper and outer dimensions and possible change to the existing asset.

With the current design there will be no change to the scale of the assets at Jarrow and Hebburn Station. At Hebburn Station due to track curvature and signal sighting there may be a requirement to extend platform by around 10m to allow safe maintenance access and/or sighting distances.

3.4. Layout – separation/size

There will be no change to the layout of the asset at Jarrow or Hebburn Stations.

**4. Possible variation/ micro-siting**

There will be no general change to the location of each station asset. The final vertical level of the platform will be dependent on the detailed design.

**5. Possible Installation methods**

The works will be carried out using Excavators, Handheld machinery and it is likely a crane will be required for part of the works, depending on the contractors chosen design and methodology.

## Bridges Technical Note

### 1. Existing Asset

Within this section of track there are four Overbridges, five Underbridges and four footbridges. These assets vary in age from over 40 years old and to over 100 years old.

### 2. Proposed Asset and reason for the change

The track alignment has been designed to avoid any bridge removal or replacement.

None of the Overbridges and Footbridges will be affected by the works.

There are like for like strengthening works and brickwork repairs proposed to the Underbridges, the final solution of which will be the responsibility of the appointed contractor. Solutions may include the introduction of additional or replacement weight bearing material to the existing structure. There will also be some repainting of the structures.

The proposed works can be found on the following drawings:

Black Road 1003313-ARC-00-XX-DR-CE-10001 &1003313-ARC-00-XX-DR-CE-10002

Potters Street 1003313-ARC-00-XX-DR-CE-20001 &1003313-ARC-00-XX-DR-CE-20002

Reyrolle 1003313-ARC-00-XX-DR-CE-30001 &1003313-ARC-00-XX-DR-CE-30002

Hill Street 1003313-ARC-00-XX-DR-CE-40001 &1003313-ARC-00-XX-DR-CE-40002

### 3. Proposed Development

#### 3.1. Design, including applicable standards

Any works will be designed to British and European standards. The assets will not change in appearance.

#### 3.2. Quantum

The quantum of materials is addressed in the Main Document in Section 4 under the heading of "Materials and Construction Activity".

#### 3.3. Scale – upper and outer dimensions and possible change to the existing asset.

There will be no change to the scale of the asset.

#### 3.4. Layout – separation/size

There will be no change to the size or layout of the asset.

### 4. Possible variation/ micro-siting

There will be no change to the siting of the asset.

### 5. Possible Installation methods

The main disruption from the bridge strengthening works will be the need for temporary road and footway closure to enable safe access - such interventions will be the subject of relevant temporary highway closure/diversion processes.

The likely equipment used will include:

- Scaffolding
- Access plant, such as scissor lifts or MEWPs
- Lifting Plant, such as a Telihandler

- Cranes or HIAB for lifting and/or unloading
- Waggons or HGVs to deliver plant and materials



# Construction Access Technical Note

## 1. Proposed delivery model

The Metro Flow project main works are planned to be delivered during a twelve week blockade starting in September 2022 - subject to change. The aim of the project programme is to minimise the duration of track closures and therefore the impact on operational services. In order to deliver the project to this programme there will also be preparation works and site setup prior to and following the blockade. These could extend six to eight weeks before and after the closure.

To achieve the works within this timescale the site will operate 24/7, with HGV movements limited to daytime, typically 08:00 - 22:00.

## 2. Existing Infrastructure

Within this section there are already existing Compound Areas and Access Points for both Pedestrians and Vehicles, all of which are shown on the following diagram:

### **NEX-COMP-001 - Compound & Access.**

### 2.1. Compound Areas

There are three existing compound areas within the work area, these are:

- Glen Street
- Jarrow
- Bede

### 2.2. Pedestrian Access Points

There are five existing pedestrian access points available to gain track access for working, these are:

- Bridge 1043 – Victoria Road West
- Wardley Substation
- Bridge 1038 – Black Road
- Fir Street
- 8009 Points – Prince Consort Road

### 2.3. Vehicle Access Points

There are three existing vehicle access points within the work area, these are:

- South Drive
- Glen Street
- Hebburn Station

### **3. Site Access**

The access type can be broadly split into three headings: Staff, Plant and Materials.

#### **3.1. Staff**

All staff will drive to a designated compound to park their personal cars, sign in and be briefed. It is then standard practise that staff will be transported by minibus to the relevant access points. Exceptions to this are for specialist vehicles and management staff not following the standard shift patterns and will travel to and park at other compound locations and/or stations.

#### **3.2. Plant**

There will be some plant in on-going use within the compound(s) from the point of site setup, such as excavators and telehandlers to setup the site and move materials. However the majority of plant will only be in use during the blockade. It will be delivered to the compound(s) or specified on-tracking point by lowloader at the start of the blockade and remain on track for the duration.

An exception to this is specialist plant, such as piling or Overhead Line plant which would be delivered to compounds or access points by lowloader as determined by the contractor.

#### **3.3. Materials**

At this stage in the project it is envisaged that the majority of materials for the track renewal will be delivered via engineering train, with trains accessing the site from the Network Rail network. These engineering trains will then also remove the spoil from site.

Some materials, such as switch and crossings and most none track materials, will still need to be delivered via road; these will be delivered by HGV or Low Loader, in accordance with the Principal Contractors programme.

### **4. Compounds**

#### **4.1. Site preparation**

The two track side compounds at Glen Street and Bede will need some preparation works, including:

- Vegetation clearance
- Site levelling, normally utilising spent ballast or existing materials

#### **4.2. Site establishment**

All compounds will have the following to ensure health and safety:

- Welfare and stores
- Fencing – typically 2m Herras fencing or similar
- Lighting – directionable
- Power – supplied by super-silenced generators
- Small plant and tools
- Depending on the activity there maybe excavators or telehandlers on site.

#### **4.3. Compound activities**

These will be dependent on the Principal Contractor's programme, but may include:

- Rail welding and storage
- Storage of materials, such as drainage materials

- Switch and Crossing setup
- Ballast storage

Depending on the Principal Contractor's programme they may choose to establish additional compounds, which will be part of a separate application processes.

## **5. Local Impact and peaks**

### **5.1. Plant and HGV movements**

There will be peak movements at the start and finish of the blockade with standard daily deliveries throughout.

Most deliveries to the principal compound(s) will be via HGV or flatbed truck, with one off large deliveries by Lowloader articulated lorries.

To reduce travel times some deliveries may be to satellite compounds to improve efficiencies and reduce environmental impact and double handling.

### **5.2. Staff Vehicles**

Staff typically work nine hour shifts, with a one hour overlap for briefings and handover. There are typically 60 staff per shift.

## **6. Possible variation/ micro-siting**

The main possible variation is if engineering trains are unavailable to transport materials into the site. In this event the track materials would need to be delivered via road and stockpiled within compounds.