

# Midland Metro

## 2.7 Construction

### 2.7.1 Principal Construction Activities

Once all the necessary powers and approvals have been obtained for the Wednesbury to Brierley Hill scheme, Centro will select a Concessionaire to design, build, maintain and/or operate the scheme.

Construction is expected to last for approximately 30 months and will involve a number of key activities, as follows:

- diversion of utilities throughout the route;
- demolition of four existing buildings adjacent to the scheme;
- demolition, replacement and extension of a number of bridges;
- corridor widening, including areas where the rail corridor is located within a cutting and areas of embankment;
- piling works associated with the strengthening of existing retaining walls;
- earthworks;
- provision of track formation and track drainage;
- track laying along the route;
- landscaping
- construction, realignment and reinstatement of highways, footpaths and cycleways;
- modifications to highway signalling;
- accommodation works (eg works required to boundary walls or frontages to accommodate the tram alignment);
- construction of over-head line electrification (OHLE) poles and building fixings and possible relocation of existing street-lighting;
- installation of tram signalling and electrical equipment;
- construction of substations and track paralleling huts;
- installation of stops and park and ride sites;
- construction of lifts, ramps and stairs to stops;
- construction of the depot extension; and
- commissioning.

The construction methods for each of these activities are described below in *Section 2.7.3* and the programming and phasing of construction works described in *Section 2.7.4*.

### 2.7.2 Working Hours

Normal working hours during construction will be 0700 to 1900 hours Monday to Friday, 0700 to 1300 hours on Saturday, with no working on Sunday or on Bank Holidays. Quiet work (eg plant maintenance) may take place outside these hours.

In addition, certain works may be required outside of the normal working hours. For example, where works to the highway are required, these may be carried out outside of 0700 to 1900 hours, in order to avoid peak rush-hour traffic and to minimise the effects of the works on road-users. Night-time working may also be required in some areas and this will be agreed with Dudley MBC and/or Sandwell MBC as appropriate, prior to works taking place, and will be subject to the noise control measures outlined in the Draft Code of Construction Practice (CoCP) <sup>(30)</sup> for the project.

A copy of the draft CoCP is provided in *Appendix D*.

The requirement for night-time working has been identified in a number of areas, as described in *Table 2.2* below.

Table 2.2 Night-time Working

Location	Purpose	Duration
Birmingham New Road	For reasons of safety it will be necessary to close Birmingham New Road during replacement of the existing Bridge Deck. To minimise impacts on traffic, this will take place at the weekend and overnight.	Weekend, including over night works.

King Street	For reasons of safety it will be necessary to close King Street during demolition of the existing footbridge. To minimise impacts on traffic, this will take place overnight.	Overnight/Sunday
Dudley Canal (North)	During replacement of bridge deck Dudley Canal will be closed. To minimise impacts on canal traffic this will take place over a single weekend, including night-time works.	Weekend, including over night works.
Dudley Canal (South)	As above.	Weekend, including over night works.

### 2.7.3 Construction Activities and Plant

#### Overview

For the purposes of this ES, the construction programme has been described in relation to eight key activities, as described in the Construction Strategy <sup>(31)</sup> for the scheme and detailed below.

#### Site Establishment

This includes the establishment of work areas (refer to *Section 2.7.5 Temporary Land Requirements*) and site access, including any preparatory works (ie site clearance, general earthworks and provision of hardstandings, office accommodation and fencing).

Where the alignment is located within the rail corridor, the existing track and ballast will be removed. In a number of areas it will also be necessary to widen the rail formation (eg in some areas between Wednesbury to the crossing of Tipton Road and from Blowers Green Road to the Pensnett Canal). Where this occurs in an area of cutting, existing vegetation will be removed from the rail formation to a distance of approximately 5 m and gabion walls will be constructed to retain the earth structures. In areas adjacent to residential properties, existing vegetation will be retained as far as possible in order to provide a visual screen (eg New Road to Dudley Port area).

Where it is necessary to widen the formation where it is embanked, new retaining walls will be constructed.

#### Enabling Works

This comprises all demolition works, site clearance, drainage, general earthworks, ground improvement and landscaping works required to establish the formation of the track. It will be necessary to demolish a number of structures in order to accommodate the proposed scheme, including the following:

- a number of small retaining walls;
- three industrial buildings adjacent to the Pensnett Canal;
- a steel framed building adjacent to Dudley Canal North; and
- the footbridge at King Street in Dudley town centre.

Earthworks will include the widening of existing railway embankments (eg adjacent to the Parkhead Viaduct) and works required to accommodate level differences (eg where the alignment leaves the existing rail corridor at Dudley Zoo). At this stage in the project, the condition of subgrade material located below the surface in areas where track will be laid is not known. However, it is expected that excavation of material to a depth of around 0.5 m to 1.2 m will be required along the track alignment. Once excavation works have been completed, track drainage will be installed. The type of drainage required will vary depending on the position and the foundation of the track.

In areas of poor soil, engineering fill or 'capping material' may be needed to provide a firm foundation for the track. This will be compacted using vibratory rollers prior to the positioning of reinforcement mesh used in the construction of a reinforced concrete base slab (in the case of street running sections of the alignment).

#### Statutory Undertakers' (SU) Works

Before the main work of installing the scheme infrastructure can start, preliminary works such as the diversion/protection of public utilities will need to take place. Utilities diversions will be required throughout the route and will involve digging new trenches for water pipes, sewers, electricity and communications cables and gas pipes. In addition, where the scheme necessitates works to, or demolition of, bridge structures, temporary bridges will be required for pedestrian access and for SU apparatus during construction.

On street running sections public utilities running within the swept path of the track will need to be relocated to minimise disruption to Metro services during their maintenance and in the event of failure. However, it may not be possible to relocate all apparatus on some sections of the route due to the restricted space on footpaths, verges or car parking bays. Where this is the case, it may be necessary to lower and protect the services from damage caused by vibration or increased load resulting from the operation of the Metro. These works may take place in advance of the main construction works associated with the scheme.

#### Highway Works

The construction of new and/or realigned sections of highway will be required in some areas to facilitate at grade crossings and on street running. This will include works to pavements, footways, surface drainage, street furniture, lighting and traffic signal control. This will include, for example:

- highway construction adjacent to Flood Street, Dudley;
- narrowing to a single lane highway at part of Castle Hill, Dudley;
- construction of at grade crossings;
- levelling works at Waterfront Way and Level Street roundabout; and
- creation of new accesses for park and ride sites.

Highway works may entail the excavation of soil and/or pavement, relaying of a formation base and/or casting of a reinforced concrete slab as described above, and resurfacing with asphalt. Traffic signals will also be required at new level crossings. Existing road markings will be removed and new markings added.

### Structures

This includes the reconstruction, refurbishment and demolition of existing major structures such as viaducts, bridges and retaining walls, in addition to the construction of new structures. Where abutments on existing canal underbridges are sufficient to accommodate the scheme these will be retained, although it will be necessary to carry out refurbishment works and to widen the existing bridge deck in some areas. Temporary closures will be required for canal traffic and protection measures will be required to protect watercourses from pollution arising from construction works.

It will also be necessary to reconstruct a number of overbridges, where these are not of sufficient width. A description of the bridge works associated with the scheme is provided below in *Table 2.3*.

Table 2.3 Associated Bridge Works

Bridge Structure	Associated Works
Smith Road underbridge.	To be demolished.
River Tame underbridge.	To be extended.
Tame Valley Canal Underbridge.	To be extended.
Pedestrian footbridge at Gold's Hill	To be constructed with implementation forming part of the proposed heavy rail scheme.
Pedestrian footbridge at Black County New Road with stepped and ramped access.	To be constructed, with implementation forming part of the proposed heavy rail scheme.
Walsall Canal underbridge.	Deck structure to be replaced/extended.
New Road overbridge.	To be reconstructed.
Horseley Road overbridge.	To be reconstructed.
Walkway overbridge at Horseley Heath.	To be reconstructed.
Lower Church Lane overbridge.	To be reconstructed.
Park Lane East overbridge.	To be reconstructed.
Footbridge at the West Coast Mainline and Birmingham Canal.	To be demolished and new bridge constructed
Coneygre Road	Redundant deck to be removed and edge beam to be replaced.
Sedgley Road East underbridge.	To be reconstructed.
Birmingham Canal underbridge.	Deck to be replaced/extended.

New Road underbridge.	Deck to be replaced/extended.
Piers and abutments forming part of the existing dismantled overbridge structure located between Tipton Road and Birmingham New Road.	To be demolished.
King Street footbridge.	To be demolished.
Parkhead Viaduct.	Removal of parapets, renovation of arches and rebuilding.
Pensnett Canal underbridge.	Existing deck structure to be replaced/extended for provision of heavy rail scheme and a new, separate underbridge constructed.
Canal Street underbridge.	Existing deck structure to be replaced/extended for provision of heavy rail scheme and a new, separate underbridge constructed.
Dudley Canal Bridges	Two new bridge structures will be constructed.

Major works will be required to the Parkhead Viaduct. This seven-arch structure will be reduced to just above arch level and rebuilt, in part with existing brick and the remainder with reclaimed brick. In addition, new parapets will be constructed and a waterproof coating applied. This will involve substantial works for a period of around nine to 12 months.

The proposed scheme will also include the demolition of four unnamed structures, including:

- three underbridge structures north of Black Country New Road adjacent to Eagle Industrial Estate; and
- an underbridge structure east of Birmingham Canal.

### Trackwork

This phase of construction activities comprises the establishment of rail formation (ie ballasted for track located within the existing rail corridor and track slab for street-running sections) and the provision of overhead electrical apparatus, trackside furniture, cabling and communication systems.

For on street running sections, the base slab is cast by pouring concrete onto reinforcement mesh, which will provide the foundation for the rails. Alternatively, pre-cast concrete slabs may be used.

The rails are then clipped to the base of the slab, levelled into position and continuously welded together. A second layer of concrete is then poured around the rails to a level that allows for road surfacing to be placed. Road surfacing is then laid around the rails. New kerbs, parking bays and base supports for overhead line equipment (OHLE) poles may be constructed concurrently, where there is enough space to construct the concrete base slab.

Track construction will be followed by OHLE installation. The approximate spacing between OHLE poles will be dependant on the speed required, curvature of the alignment and the gradient of the track. Additional supports may be needed at highway junctions and closer spacing will be required on bends.

### Tram Stops and Park and Ride Sites

This includes all works associated with tram stops including platforms, furniture, systems and access arrangements (ie stairs, lifts and ramps etc). All of the proposed park and ride sites have also been identified as possible work sites for use during the construction of the scheme (see *Section 2.7.5* below). Since these sites will be in use throughout construction, it will not be possible to construct the park and ride facilities until the end of the construction programme. This will include re-surfacing works, access works and the provision of lighting, CCTV and landscaping.

### Miscellaneous Items

This includes the construction and installation of equipment for substations and track paralleling huts.

A summary of the plant that will be used in undertaking the construction activities described above is given below in *Box 2.1*.

#### Box 2.1 Summary of Main Construction Plant

<ul style="list-style-type: none"> <li>• earth moving plant;</li> <li>• earth compaction plant;</li> <li>• vibratory rollers;</li> <li>• sheet pile drivers;</li> </ul>
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- mobile cranes;
- delivery lorries;
- track laying equipment;
- compressors;
- generators;
- black top planing and surfacing machines;
- piling for bored concrete retaining walls and structures;
- pneumatic drills; and
- hand held power tools.

## 2.7.4 Mine Workings

The proposed alignment crosses areas of coal bearing strata that are known to have been mined in the past. The exact nature of these workings including their locations, depths and present condition is not known at present. As a consequence, any works required to address such abandoned mine workings are also undefined. During the detailed design of the scheme following the TW Order application process, further investigations will be required to identify the scope of any remedial works required to stabilise abandoned mine workings. The methodology for such investigations will be in accordance with CIRIA Special Publication 32 <sup>(32)</sup> and undertaken in a staged manner to focus the resources in the area of greatest risk.

This will initially involve a desk study of geological maps, historic maps and historic mining records. Other sources of information may include the existing railway operator for risk registers, construction records, agreements for the mining of coal beneath the railway, and Network Rail's mining engineer or regional geotechnical engineer. The desk study will identify possible mine workings, with the nature of the anticipated underground feature, particularly its depth and accuracy of the historic records, determining the type of site investigation necessary. Trial pits may be utilised to investigate shallow features, and boreholes may be required to locate underground tunnels. Alternatively, a geophysical survey may be appropriate to further define the location of mine shafts prior to an intrusive investigation.

The investigations will be more extensive at the locations of structures, where there is a greater risk of mine related subsidence causing damage to properties/structures, and will be required to extend beyond the depth of influence of any proposed piled foundations.

Once the nature of mine workings has been established, appropriate design solutions will be adopted and developed. This may include, for example, pre-construction grouting for shallow mine workings.

## 2.7.5 Programming and Phasing of Construction

It is envisaged that the scheme will be constructed over a period of approximately 30 months, between the end of 2006 and 2008 with the scheme opening in 2008. The scheme will be divided into a series of works areas, as described in the Construction Strategy, report that serve the alignment corridor, as described below in *Section 2.7.5*.

The phasing of construction works is described below in *Table 2.4*.

The phasing of works described in *Table 2.4* does not include works associated with the construction of park and ride sites. It is envisaged that these works will take around three months to complete at each site.

Table 2.4 Phasing of Construction Works

Activity	Programme from Start of Construction	Total Duration (months)
<i>Existing Rail Corridor – Wednesbury to Tipton Road</i>		
Site Establishment	Months 1 and 32	1.5
Enabling Works:		
• Line 1 connection to Tame Valley Canal	Months 2 to 12	10.0
• Tame Valley Canal to New Road	Months 5 to 10	5.0
• New Road to Dudley Port	Months 8 to 14	6.0

Dudley Port to Sedgley Road East	Months 11 to 15	4.0
Sedgley Road Easy to Tipton Road	Months 14 to 22	7.0
Statutory Undertakers' Works	Not applicable	-
Highway Works	Not applicable	-
Structures:		
· Wednesbury viaduct	Months 2 to 14	12.0
· River Tame underbridge	Months 3.5 to 8	4.5
· Tame Valley Canal underbridge	Months 6.5 to 9.5	3.0
· Walsall Canal underbridge	Months 2 to 4.5	2.5
· New Road overbridge	Months 9 to 19.5	10.5
· Horseley Road overbridge	Months 2 to 12	10.0
· Lower Church Lane overbridge	Months 9 to 19.5	10.5
· Park Lane East overbridge	Months 2 to 13	11.0
· WCML/Birmingham Canal overbridge	Months 8 to 11	3.0
· Coneygre Road underbridge	Month 10	1.0
· Sedgley Road East underbridge	Months 18 to 26.5	8.5
· Birmingham Canal underbridge	Months 9.5 to 13.5	4.0
· Birmingham New Road underbridge	Months 12 to 14	2.0
Trackwork:		
· Line 1 connection to Tame Valley Canal	Months 19.5 to 21.5	2.0
· Tame Valley Canal to New Road	Months 21 to 23.5	2.5
· New Road to Dudley Port	Months 23 to 25.5	2.5
· Dudley Port to Sedgley Road East	Months 25 to 27	2.0
· Sedgley Road Easy to Tipton Road	Months 26.5 to 29	2.5

· Systems	Months 25 to 32	7.0
Stop Construction:		
· Great Bridge (New Road)	Months 19.5 to 24	4.5
· Horseley Road	Months 10.5 to 13.5, 24.5 to 26	4.5
· Dudley Port	Months 12.75 to 15.75, 25.5 to 27	4.5
· Sedgley Road East	Months 23.5 to 27	4.5
· Birmingham New Road	Months 17.5 to 20.5, 27.5 to 29	4.5
Miscellaneous:		
· Substations/track paralleling huts	Months 12.5 to 16.5	4.0
<i>Dudley Centre – Tipton Road to Blowers Green Road</i>		
Site Establishment	Months 1 and 30	1.0
Enabling Works:		
· Tipton Road to Castle Hill	Months 2 to 9.5	7.5
· Castle Hill to Dudley Bus Station	Months 13.5 to 15.5	2.0
· Bus Station to Flood Street	Months 10.5 to 14.5	4.0
· Flood Street to Cinder Bank	Months 8.5 to 11.5	3.0
Statutory Undertakers' Works:		
· Tipton Road	Months 14.5 to 17.5	3.0
· Castle Hill	Months 2 to 16	14.0
· Birmingham Street (North)	Months 7 to 14	7.0
· Birmingham Street (South)/King Street	Months 2 to 12	10.0
· Flood Street/Mill Street	Months 2 to 10	8.0

Highway Works:		
· Tipton Road	Months 17.5 to 20	2.5
· Castle Hill	Months 16 to 23.5	7.5
· Birmingham Street (North)	Months 14 to 17.5	3.5
· Birmingham Street (South)/King Street	Months 12 to 16	4.0
· Flood Street/Mill Street	Months 10 to 16	6.0
Structures:		
· King Street footbridge (demolition)	Month 8	1.0
Trackwork:		
· Tipton Road to Castle Hill	Months 23.5 to 27.5	4.0
· Castle Hill to Dudley Bus Station	Months 20.5 to 26	5.5
· Bus Station to Flood Street	Months 18 to 22.5	4.5
· Flood Street to Cinder Bank	Months 14.5 to 21	6.5
· Systems	Months 20.5 to 26.5	6.0
Stop Construction:		
· Tipton Road	Months 27.5 to 29	1.5
· Dudley Bus Station	Months 22.5 to 24	1.5
· New Road	Months 11.75 to 14.75 and 18.5 to 20	4.5
· Cinder Bank	Months 10 to 13 and 16.5 to 18	4.5
Miscellaneous:		
· Substation	Months 20 to 24	4.0
<i>Existing Rail Corridor – Blowers Green Road to Pensnett Canal</i>		
Site Establishment	Months 1 and 24	1.5

Enabling Works:		
· Cinder Bank to Parkhead Viaduct	Months 8.5 to 12.5	4.0
· Parkhead Viaduct to Pedmore Road	Months 5.5 to 9	3.5
· Pedmore Road to Merry Hill	Months 3.5 to 6	2.5
Statutory Undertakers' Works	Not applicable	-
Highway Works	Not applicable	-
Structures:		
· Parkhead Viaduct	Months 2 to 20	18.0
· Pedmore Road overbridge	Months 2 to 3.5	1.5
Trackwork:		
· Cinder Bank to Parkhead Viaduct	Months 21 to 23	2.0
· Parkhead Viaduct to Pedmore Road	Months 20 to 21.5	1.5
· Pedmore Road to Merry Hill	Months 19.5 to 20.5	1.0
· Systems	Months 21.5 to 24.5	3.0
Stop Construction:		
· Pedmore Road	Months 12.5 to 15.5, 21.5 to 23	4.5
Miscellaneous:		
· Substations/track paralleling huts	Months 8.5 to 12.5	4.0
· Round Oak Rail headshunt	Months 16 to 19	3.0
<i>Merry Hill – Pensnett Canal to Brierley Hill</i>		
Site Establishment	Months 1 and 29	1.5
Enabling Works:		

· Merry Hill to Dudley Canal (North)	Months 2 to 4.5	2.5
· Dudley Canal (North) to Level Street	Months 3.5 to 8.5	5.0
· Level Street to Dudley Canal (South)	Months 10 to 13	3.0
· Dudley Canal (South) to Brierley Hill	Months 7.5 to 11.5	4.0
Statutory Undertakers' Works:		
· Canal Street	Months 7 to 8.5	1.5
· Waterfront Way (North)	Months 8.5 to 10	1.5
· Waterfront Way (South)	Months 10 to 12	2.0
· Level Street	Months 2 to 7	5.0
· The Embankment (Road)	Months 12 to 14	2.0
· Brierley Hill	Months 14 to 16	2.0
Highway Works:		
· Canal Street	Months 8.5 to 11.5	3.0
· Waterfront Way (North)	Months 10.5 to 12.5	2.0
· Waterfront Way (South)	Months 11.5 to 15	3.5
· Level Street	Months 14 to 18.5	4.5
· The Embankment (Road)	Months 17.5 to 19.5	2.0
· Brierley Hill	Months 18.5 to 20.5	2.0
Structures:		
· Pensnett Canal underbridge	Months 4.5 to 10	5.5
· Canal Street underbridge	Months 8 to 12	4.0
· Former Hill and Smith embankment	Months 10 to 13.5	3.5
· Dudley Canal (North) underbridge	Months 3 to 10	7.0
· Canalside plateau retaining wall	Months 7 to 11.5	4.5

Dudley Canal (South) underbridge	Months 11.5 to 20.5	9.0
Trackwork:		
Merry Hill to Dudley Canal (North)	Months 13.5 to 17.5	4.0
Dudley Canal (North) to Level Street	Months 16.5 to 21.5	5.0
Level Street to Dudley Canal (South)	Months 20.5 to 24	3.5
Dudley Canal (South) to Brierley Hill	Months 23 to 27	4.0
Systems	Months 24.5 to 29.5	5.0
Stop Construction:		
Waterfront Development	Months 20.5 to 22	1.5
Merry Hill	Months 11.5 to 14.5, 22.5 to 24	4.5
Brierley Hill terminus	Months 27 to 29	2.0
Miscellaneous:		
Substation	Months 19 to 23	4.0

## 2.7.6 Temporary Land Requirements

### Overview

Temporary land will be required during the construction of the scheme for the storage of plant and materials, and to accommodate the site offices. In selecting work sites, the following issues have been considered:

- the extent of coverage provided for the entire alignment, so that extended haul distances are avoided;
- the location of existing business close to the work sites;
- the availability of areas, including vacant or derelict sites;
- connection to the main alignment corridor; and
- access to the public highway.

A description of each of these sites, including information on enabling works required to operate the site and the duration of construction activities, is provided below in *Table 2.5*. The location of work sites is shown in *Figure 2.1*.

Details temporary land requirements (in addition to those sites required for work areas described in *Table 2.5*) are provided in *Section 5.2*, which discusses land take during construction and operation. This is based on information provided in the Construction Strategy. *Table 2.5* Schedule of Work Areas

Site Location and Area	Surrounding Land Use	Enabling Works	Construction Activities	Duration of Activities
Existing Rail Corridor – Wednesbury to				

<i>Tipton Road</i>				
1 – Part of the existing Line 1 depot (c. 6700 m <sup>2</sup> )	Site located within industrial area. Leabrook Waste Repository Site and Ocker's Pool SLINC are located to the south of the site.	Connection to the depot road will be required via an existing entrance. This will require rearrangement of the existing tram sidings and OHLE.  A direct at grade crossing to the tram corridor on a retained embankment/viaduct will also be required.  The site is located adjacent to the Leabrook Waste Repository site and hence, the groundmass may be contaminated.	General works between Line 1 and Tame Valley Canal underbridge including: connection to Line 1; viaduct construction; construction of retained embankments; and improvement works to River Tame and Tame Valley canal underbridges.  The site may also provide a suitable location for the establishment of site offices during construction.	The site will operate for the duration of the construction works.  A reduced site (ie main office) will be retained during commissioning and maintenance.
2 – Derelict former industrial site (c. 8000 m <sup>2</sup> )	Site located within Eagle Industrial Estate, adjacent to Gold's Green.	Connection to Bagnall Street via Eagle Lane Industrial Estate road and direct at grade crossing to the scheme alignment.	General works between Tame Valley canal underbridge and Black County New Road overbridge including improvement works to the Tame Valley Canal underbridges and the demolition of two unnamed structures.	The site will operate for the duration of the construction works.
3 – Vacant site adjacent to Bagnall Street, partly located beneath Black Country New Road overbridge (c. 2000 m <sup>2</sup> )	Site located within industrial area, although residential properties are located on the opposite side of the alignment to the work site.	Connection to Bagnall Street via an existing paved entrance and direct at grade crossing to the scheme alignment. Construction activities on the site may be restricted by headroom under the overbridge.	General works between Black County New Road overbridge and Dudley Port stop, including: demolition of one unnamed structure; improvement works to the Walsall canal underbridge; track level works for reconstruction of New Road, Horseley Road, Lower Church Lane, Park Lane East overbridges; demolition of access walkway overbridge; and construction of Great Bridge (New Road) and Horseley Road stops.	The site will operate for the duration of the construction works.
4 – Section of Railway Street (c 3900 m <sup>2</sup> )	Residential properties are located to the north and west, with industrial premises to the east and south. Following use as a works site, this will become a Park and Ride site.	Direct connection to Horseley Road. A significant level difference precludes direct access to scheme alignment.	Works in connection with reconstruction of Horseley Road overbridge, provision of a substation and construction of a turning head on Railway Street (which will be subject to permanent closure).	During specific reconstruction works, c. 10 months
5 – Existing builders merchant	Residential properties are	Connection to Park Lane East via an	General works between Dudley Port stop and	The site will operate for the

site (c. 2200 m <sup>2</sup> )	located to the north and west. The site is bordered by the West Coast Main Line and industrial units. Following use as a works site, this will become a Park and Ride site.	existing entrance. Regrading works are required to enable direct access to scheme alignment.	Sedgley Road East underbridge including: improvement works to the West Coast Main Line and Birmingham Canal overbridges; demolition of pedestrian footbridge; and construction of Dudley Port and Sedgley Road East stops.	duration of the construction works.
6 – Section of Coneygre playing fields (c. 5100 m <sup>2</sup> )	Residential properties are located to the north and east. The site is located in the north eastern corner of the playing fields. The extent of the site is based on the requirement to retain a single realigned football pitch.	Connection to Sedgley Road East via existing entrance, with significant improvement works to address issues of construction traffic, including earthworks, road widening, visibility and traffic control measures.  Accommodation works to reconfigure the existing football pitch and reinstate land drainage will be required.	General works between Sedgley Road East underbridge at Tipton Road, including: improvement works to Birmingham Canal and Birmingham New Road underbridges; demolition of bridge piers; and construction of Birmingham New Road stop.	The site will operate for the duration of the construction works.
<i>Dudley Centre – Tipton Toad to Blowers Green Road</i>				
7 – Part of Dudley Zoo car park (c. 3800 m <sup>2</sup> )	Dudley Zoo is located to the south west of the site. Commercial properties on Castle Hill are located to the south. Availability of this site is dependant on development proposals for the car park and former Dudley Freightliner site.	Connection to Station Drive via existing entrance and direct at grade access to the scheme corridor, following completion of embankment works.	General works between Tipton Road and Birmingham Street South including: diversion of services; highway works to Tipton Road, Station Drive, Castle Hill, Birmingham Street South and Bourne Street; construction of on-street trackform; and construction of the Dudley Bus Station stop.	The site will operate for the duration of the construction works.
8 – Part of existing car park (c. 2800 m <sup>2</sup> )	Car parking and retail/commercial units.	Existing connection to Constitution Hill/New Mill Street via paved car park entrance. With the proposed reconfiguration of local road network a new dedicated entrance will be necessary, with the adjacent works phased to ensure access is retained throughout.  Direct at grade	General works between Dudley bus station and Cinder Bank stop including: diversion of services; highway works to Birmingham Street (N)/Trindle Road/King Street/Flood Street/New Mill Street/Constitution Hill; construction of the on-street running track and New Road stop.	The site will operate for the duration of the construction works.

		crossing to the scheme alignment.  Access to the south will be dependent on completion of earthworks between Flood Street and Dudley southern bypass. The full area will not become available until completion of The Minorities/ New Mill Street/Constitution Hill realignment works.		
9 – Vacant secure site adjacent to New Road  (c. 3200 m <sup>2</sup> )	Residential properties are located on New Road and Shaw Road to the west of the site. The remaining area is industrial in nature. Following use as a works site, this will become a Park and Ride site.	Connection to New Road via an existing entrance. Minor demolition/regrading works required to provide working area. The site is segregated from the alignment by the existing heavy rail corridor. Access is via New Road. A significant level difference precludes direct access to the alignment corridor.	Works in connection with construction of access structure to New Road stop including stairs, lifts and an extension to the embankment.	Duration of specific construction works, c. 3 months
<i>Existing Rail Corridor – Blowers Green Road to Pensnett Canal</i>				
10 – Vacant site adjacent to Thomleigh Trading Estate/Cinder Bank (c. 4200 m <sup>2</sup> )	The surrounding area is industrial in nature. However, some residential properties are located on Blowers Green Road to the north.  Following use as a works site, this will become a Park and Ride site.	Connection to access road via existing entrance. Regrading works to enable direct access to alignment.	General works between Flood Street roundabout and Parkhead Viaduct, including: track level works for the remediation of Parkhead Viaduct; construction of on street trackform; and construction of New Road and Cinder Bank stops.  This site could provide an alternative location to the Line 1 depot for the main offices.	The site will operate for the duration of the construction works.  A reduced site (ie main office) will be retained during commissioning and maintenance.
11 - Ground level area around Parkhead Viaduct, including section of Dudley Canal/Parkhead Locks and part of adjacent properties (allotment and industrial premises) (c. 5300 m <sup>2</sup> )	The site is located within the Parkhead Conservation Area. Peartree Industrial Estate is located to the north east. An area of open space and residential properties are located to the south west.	Connection to be established to Peartree Lane or Holly Hall Road. Measures required to enable access across navigable waterway whilst maintaining canal traffic (temporary bridge/scaffolding).  A significant level difference precludes direct access onto main site (tram	Works in connection with remediation of the existing viaduct structure, including erection of formwork / scaffolding, structural improvements and restoration of brickwork.  Temporary canal closures required for implementation/removal of access measures across waterway.	Duration of specific construction works  c. 18 months

		corridor).		
<i>Merry Hill – Pensnett Canal to Brierley Hill</i>				
12 – Part of former Hill and Smith site (c. 7900 m <sup>2</sup> )	This site is located within an industrial area. Following use as a works site, this will become a Park and Ride site.	Connection to Canal Street with route across hardstanding of vacant site. Direct at grade access to scheme alignment, through adjacent works via a retained embankment. Works to be phased to ensure access is not compromised.	General works between Pensnett Canal underbridge and Dudley Canal underbridge, including: construction of the Pensnett Canal and Canal Street underbridges; construction of a retained embankment; and highway works to Canal Street.	The site will operate for the duration of the construction works
13 – Victorian engineering works (c. 4900 m <sup>2</sup> )	This site is located within an industrial area.	Connection to Round Oak Rail access road. Existing Victorian engineering building to be demolished. Direct at grade access to scheme alignment through adjacent works via an embankment, to be phased to ensure access is not compromised.	General works between Dudley Canal (North) underbridge and Dudley Canal (South) underbridge, including: diversion of services; highway works to Round Oak Rail access road, Waterfront Way (North and South) and Level Street; construction of on street trackform; and construction of Waterfront Development and Merry Hill stops.	The site will operate for the duration of works to the Merry Hill section of the alignment.
14 – Public car park (c. 2000 m <sup>2</sup> )	Brierley Hill Leisure Centre is located to the east and south, with retail and commercial properties to the north and west.	Connection to Little Cottage Street via existing entrance. Existing Housing Association offices to be demolished.	General works between Dudley Canal (South) underbridge and Brierley Hill terminus, including: earthworks (required to form cutting); diversion of services; highway works to Cottage Street and Leisure Centre access road; construction of on street trackform; and construction of the Brierley Hill terminus.	The site will operate for the duration of works to the Merry Hill section of the alignment.

### 2.7.7 Spoil Generation

During construction of the scheme, significant quantities of spoil will be generated from the following activities:

- removal of the existing ballast and drainage works where the alignment follows the heavy rail corridor;
- earthworks required to widen the railway corridor where it is in cutting;
- excavation works associated with the removal of Japanese knotweed and Indian balsam (see below and *Section 6.7*);
- demolition of bridges and other structures, including removal of bridge decks; and
- earthworks associated with track-laying for street-running sections of the alignment.

Approximately 144 000 m<sup>3</sup> of spoil will be generated during the construction of the scheme, which equates to around 19 000 HGV loads <sup>(33)</sup>. This figure assumes that no spoil is generated as a result of dealing with mine workings. If mine workings are encountered during the construction of the scheme, spoil arisings may be greater than specified above.

Details of spoil arisings from the scheme are also discussed in *Section 7.11*.

Due to the historical use of the alignment corridor as an operational railway, and as a result of neighbouring industrial activities, there is the potential for contaminated land to exist on the proposed route. Consequently, there is also the potential for some of the spoil generated by the works to be

contaminated (see *Section 7.10*). The Concessionaire will determine whether a site is likely to contain contaminated material prior to any works commencing. Where land is identified as being contaminated, the Concessionaire will be required to dispose of any contaminated spoil at a suitably licensed waste disposal site in accordance with the Waste Management Licensing Regulations 1994. Wherever possible, non-contaminated spoil will be reused during the construction of the scheme, used for other construction projects, or as a last resort, disposed of at a licensed waste disposal facility.

Two species listed on Schedule 9, Part II of the Wildlife and Countryside Act 1981 and amendments have been recorded along the route. These were *Fallopia japonica* (Japanese knotweed) and *Impatiens glandulifera* (Indian balsam). Both are aggressive alien species and under Section 14 of the Act it is an offence to release or allow them to escape into the wild. Measures to prevent the spread of these species are described in the draft CoCP.

### 2.7.8 Construction Workforce

It is estimated that the combined workforce for all work sites at any one time, will peak at about 250 people. The period of peak activity is expected to last from month 12 to month 24 of the 30 month programme (see *Section 2.7.4*). At other times, the workforce is expected to be in the region of around 150 people. It is not known at this stage how the workforce will be spread across the 14 work areas.

### 2.7.9 Construction Traffic

Traffic will be generated by construction personnel accessing and egressing worksites and by HGVs transporting plant, materials and waste.

Some construction personnel are likely to access the site using public transport, although most are expected to use private vehicles. Since much of the alignment is located within an existing railway corridor, access will be limited to the work areas identified above in *Section 2.7.5*. Parking for private vehicles will be provided at each of these sites. On-street parking is not expected to occur as each work area is of sufficient size to accommodate the car parking requirements for the estimated peak workforce.

The levels of HGV traffic will vary throughout the construction period. A description of generated construction traffic throughout the construction programme is provided in *Section 7.3*

### 2.7.10 Code of Construction Practice

In order to minimise the impacts of construction, a draft Code of Construction Practice (CoCP) has been developed for the Midland Metro Network extensions. This is attached in *Appendix D*. The draft CoCP will be advanced through discussion with Dudley and Sandwell MBCs. This represents the minimum level of mitigation to which Centro is committed.

The CoCP sets out the measures that will be undertaken by the Concessionaire to ensure site safety and environmental best practice. This encapsulates relevant statutory codes of practice, standards and Acts applicable to the regulation of construction practice and its effects on health and safety and the environment. The CoCP will be included in the contractual arrangements between Centro and its selected Concessionaire, and adherence will therefore be compulsory. It should be noted that compliance with the CoCP will not discharge the Concessionaire, or its agents, from complying with any statutory requirements in force at the time.

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