Bonneagar Iompair Éireann
Transport Infrastructure Ireland

NTA
Údarás Náisiúnta Iompair
National Transport Authority

Luas Finglas

Environmental Impact Assessment Report 2024

Appendix A10.5: Drainage Design Basis

BARRY TRANSPORTATION
egis GROUP
egis

Project Ireland 2040
Building Ireland's Future

Table of Contents

List of Figures

SECTION 1: DRAINAGE

1.1 Design Principles

This document outlines the approach to the drainage design of Luas Finglas Reference Design. Whilst the Luas Finglas is considered to be urban infrastructure, there are extensive sections running through either parkland, green strips of land or grass verges.

Outlined below are the design principles for the reference design:

- Where possible SuDS based systems have been used to dispose of surface water runoff generated by the proposed Scheme. The Luas Finglas approach to SuDS will align with nature-based solutions as detailed in Dublin City Council's Climate Change Action Plan 2019-2024 and also recent IFI Guidelines Planning for Watercourses in the Urban Environment. SUDS principles typically adopt vegetated open systems such as swales and attenuation ponds which facilitate filtration of surface water runoff from paved areas. SUDS feature not only allow surface water infiltrate to ground but also facilitate storm water attenuation and treatment of water quality;
- At the request of Dublin County Council, where possible, it has been the objective of the designers to alleviate some of the pressure on the existing drainage networks within the region. This has been achieved through the use of attenuation systems, SuDS systems and changing of hardstanding areas to grassed areas;
- Outfall rates from the attenuation areas were based on greenfield and brownfield assessments;
- In addition to the statutory requirements, the Health and Safety of construction and maintenance personnel was considered at all stages of the design, and it was a design objective to minimise risk wherever possible in accordance with the Principles of Prevention;
- As the maintenance of the system is to be carried out by two different parties; one carrying out the maintenance of the rail drainage, and a second separate party carrying out the maintenance of the roads, pedestrian footpaths and cycle ways. This was considered in the design; and
- The design has taken into the consideration the sensitive habitats which are impacted by the proposed route, the River Tolka, the Royal Canal, and Integrated Constructed Wetland.

Layout drawings along the entire route and standard details of the Reference Design Proposals are provided in Appendix A.

1.2 Design Parameters

The design criteria are based on the TII suite of drainage design standards and the Greater Dublin Strategic Drainage Strategy (GDSDS). The Reference Design has been designed in accordance with the following criteria:

- Sealed Carrier pipes were designed so as not to surcharge out of the pipes during the 1 in 2-year Critical Storm Condition (This Critical Storm Condition will incorporate a 20% Climate Change Allowance);
- Filter Drains were be designed so as not to surcharge out of the pipe during the 1 in 5-year Critical Storm condition;
- A time of concentration of 4 minutes was used;
- The new elements of the drainage systems were assessed for the critical storm 1 in 100-year flood condition (the critical storm will incorporate a 20% margin for climate change). Whilst out of chamber flooding will was be allowable during the critical 1 in 100-year condition (the critical storm will incorporate a 20% margin for climate change), the overland flow and it's impacts on the design have also been considered;
- New attenuation storage units in the form of ponds, swales, tanks, pipes and similar methods were sized to accommodate the critical 1 in 100-year storm (the critical storm will incorporate a 20% margin for climate change). Outfall rates from attenuation areas were based on greenfield and brownfield estimates;

- Chambers were provided at changes in directions, and no pipe runs longer than 90 meters between chambers were permitted;
- The minimum size for carrier pipes between manhole chambers was 225mm. Smaller diameter pipes may be used for gulley connections, narrow filter drains, and filter strip drainage;
- The M5-60 value for use with the Microdrainage software package was 17.00mm; and
- The R value for use with the Microdrainage software package shall be 0.300.
  For very flat sections of road pavements a continuous drainage system was provided in the form of kerb drainage units or similar.

The above will be expanded upon and altered as necessary throughout the lifecycle of the preliminary design phase.

1.3 Sustainable Urban Drainage Systems (SuDS)

Where possible the drainage system has incorporated Sustainable Urban Drainage Systems (SuDS). Sustainability has been considered with respect to the materials used in the drainage systems, and the amount of maintenance that these systems require. It is identified that maintenance itself is a component of the projects carbon footprint. The use of SuDS (Sustainable Urban Drainage Systems) has been used throughout the design. SuDS systems have been incorporated successfully into infrastructure projects in Ireland and the UK, and the systems described below have been previously used on other projects. Below is a summary of the main elements used in the drainage design. Beside each element there is a brief explanation as to why this solution is an improvement on traditional drainage systems in terms of sustainability. For the Luas Finglas, the SuDS systems detailed below were used:

Rain Gardens and Bio-Retention Areas: Bioretention areas (also referred to as bioretention cells or rain gardens) use soil, plants and microbes to treat stormwater before it is infiltrated or discharged. Bioretention areas are shallow depressions filled with sandy soil, topped with a thick layer of mulch, and planted with dense vegetation. Stormwater runoff flows into the bioretention area, percolates through the soil (which acts as a filter) and eventually drains into the groundwater; some of the water is also absorbed by the plants. Bioretention areas are usually designed to allow ponded water and with an overflow outlet to prevent flooding during larger storm events. Where soils have low permeability or where faster drainage is desired a perforated underdrain that routes to a storm drain system may be installed.

On the Luas Finglas raingardens and bio-retention areas are used for the collection of surface water from footpaths, cycleways, grassed areas and the green form Luas Track. Where rain gardens are taking larger flows from pipes networks, and incorporate rapid drawdown features, they are known as Bio-Retention Areas. On the Luas Finglas Project Rain Gardens/Bio-Retention Areas are not used for the disposal of runoff from pavement which is used by vehicular traffic. Rain gardens located in areas where infiltration rates are below what is required to allow for infiltration shall be lined and will be positively drained-see Figure 6 below. Where Bio-Retention Areas are accepting runoff from surfaces which could contain pollutants in the form of de-icing salts a mechanism will be provided which will allow rapid draining of the subsurface material when required. The rapid drawdown feature typically takes the form of a perforated drainage pipe along the base of the filter material, which connects to an outfall or drainage network. The drawdown pipe has a shutoff valve which is typically closed during normal operation. This can be opened when large volumes of water need to be released quickly such as rapid snow melt released to the network. The specific details of the Bio-Retention Areas/Rain Gardens filter material and its planting, together with the number and locations of drawdown pipes will be determined during detail design.

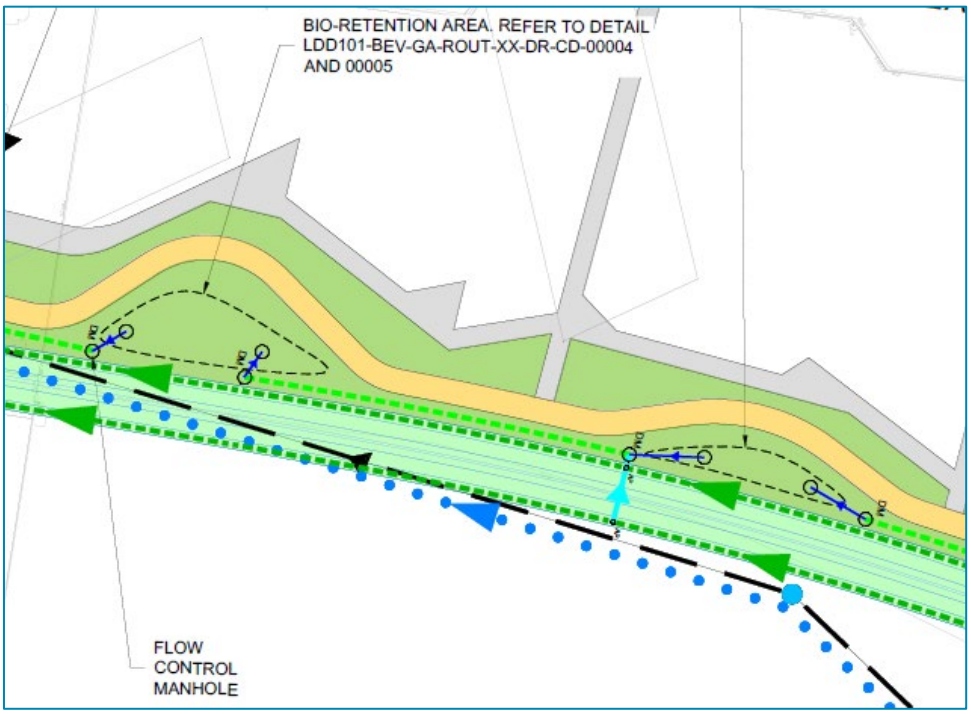


Figure 1: Examples of Bio-Retention Areas on the Luas Finglas Design

Stockholm Tree Pit System: The Stockholm tree pit is a technique that simultaneously reduces runoff and improves tree growth, while preserving the sturdiness of urban soil. This planting method reduces the decline in tree health due to soil sealing by using a soil and stone mixture that both aerates and fertilizes the soil resulting in improved tree growth and facilitating rainwater infiltration. Refer to Figure 6 below. Singular trees will be allocated a 25m^2 rootzone plan area and a perforated drainage pipe will provide in the rootzone to drain the feature. When multiple trees are proposed the perforated drainage pipe will link multiple trees then drain to the outfall. As a result, the rootzone plan area per tree can then be reduced to 16m^2.

A drain down (perforated) pipe shall be provided to ensure there is no prolonged waterlogging of roots and no build-up of road salt within the SuDS tree pit. In addition, the soil will need to receive enough water to enable the tree to grow- either supplied naturally or artificially.

Infiltration Trenches: These are similar to rain gardens in that they are designed to allow collected surface water to disperse to the surrounding subsoils, but do not include a landscaped surface which may incorporate trees and plants. Infiltration trenches are provided in parallel with the proposed Green Form Luas track through Tolka Valley Park.

Vegetated Wetland: This is a form of attenuation pond which will be planted with appropriate plant species that will act as a filtration mechanism to incoming surface water and will promote biodiversity in the surrounding environment. Only one vegetated wetland is proposed on the Luas Finglas. This will be adjacent to the Integrated Constructed Wetland. The new vegetated wetland will take surface water from the grass form Luas Track before outfalling to the piped Finglaswood Stream.

Filter Drains: These consist of a gravel trench which can incorporate a perforated pipe to allow better dispersal of surface water through the medium. These are similar to the filter drains as detailed in the TII SCD's for road projects, (Standard Detail CC-SCD-00521), but are slightly different as filter strips are not designed to convey collected surface water, but to disperse it to the surrounding subsoils.

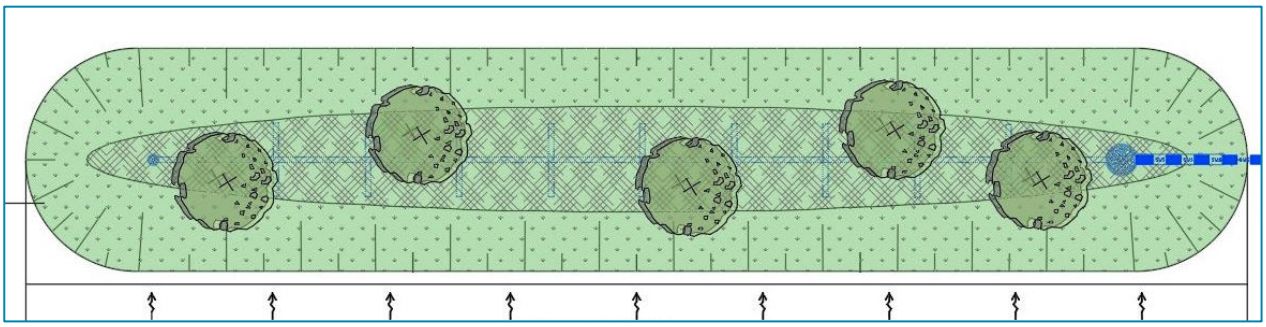


Figure 2: Plan of Bio-Retention Area

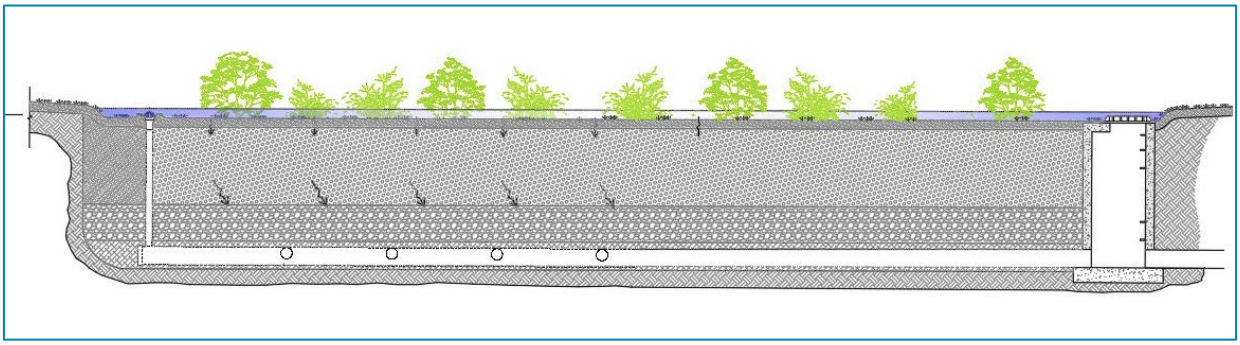


Figure 3: Longitudinal Section of Bio-Retention Area

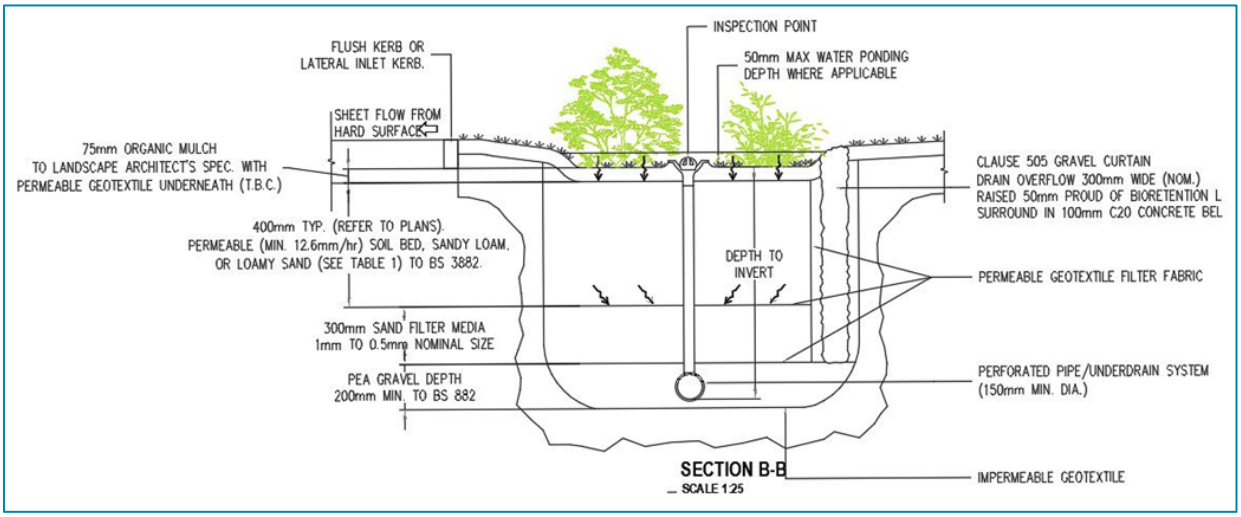


Figure 4: Cross Section through Bio-Retention Area

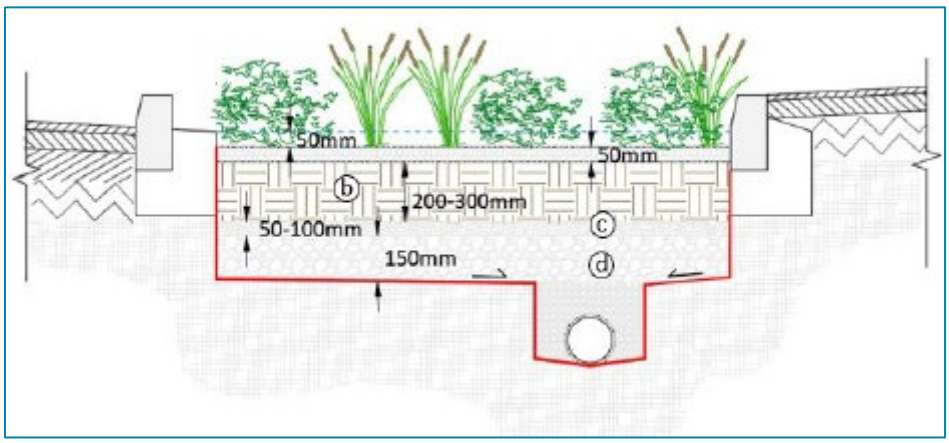


Figure 5: Cross Section through Rain Garden incorporating 'Rootzone'

Figure 6: Rain Garden incorporating Liner under Construction

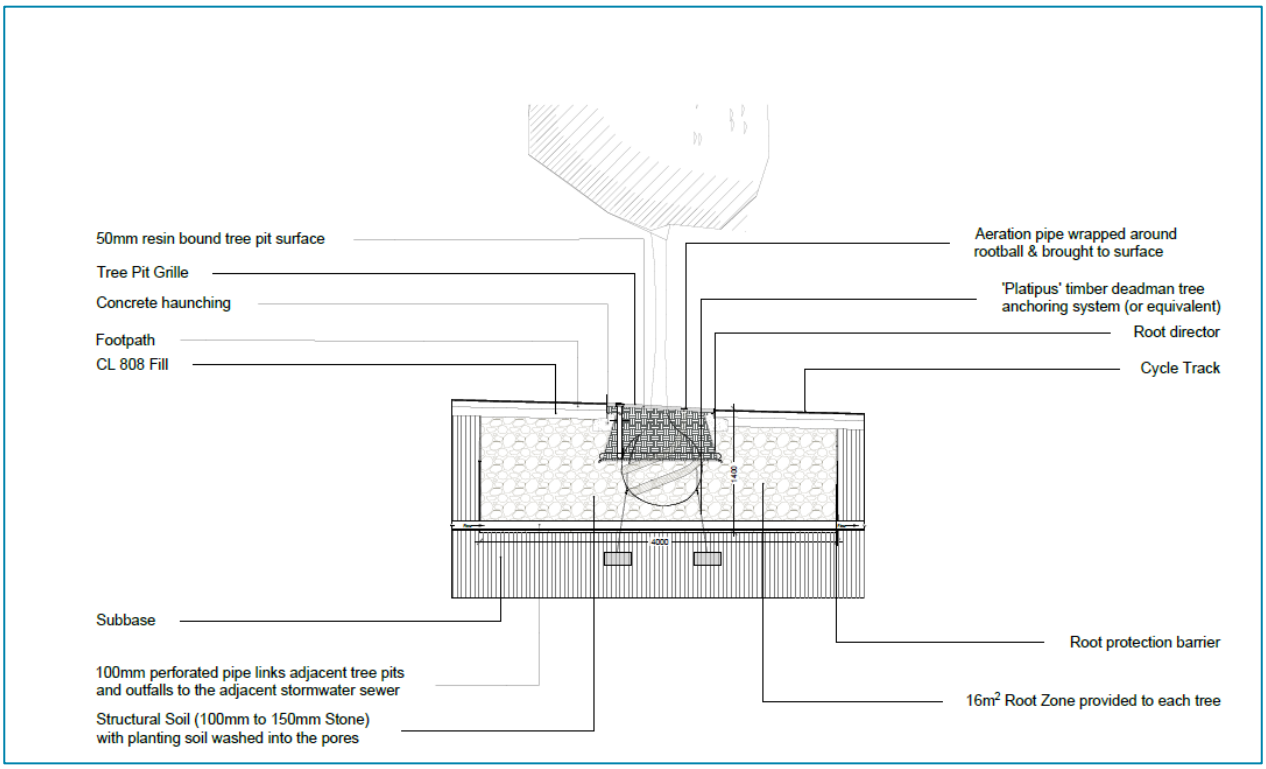


Figure 7: Cross Section of Stockholm Tree Pit

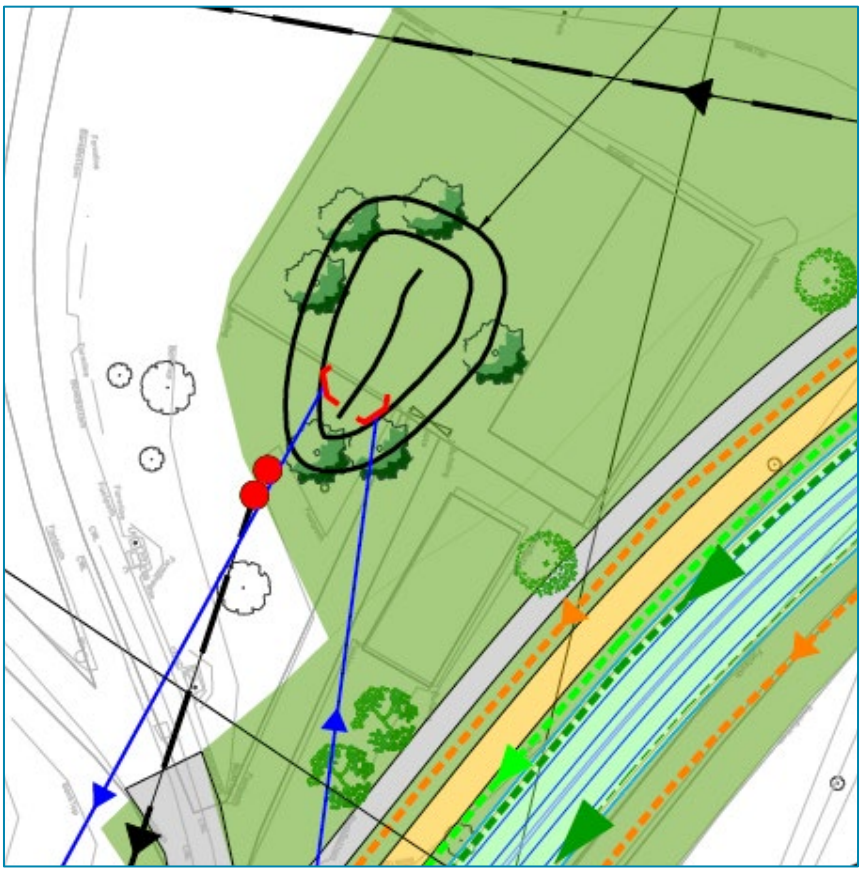


Figure 8: Proposed Vegetated Wetland Adjacent to Integrated Constructed Wetland

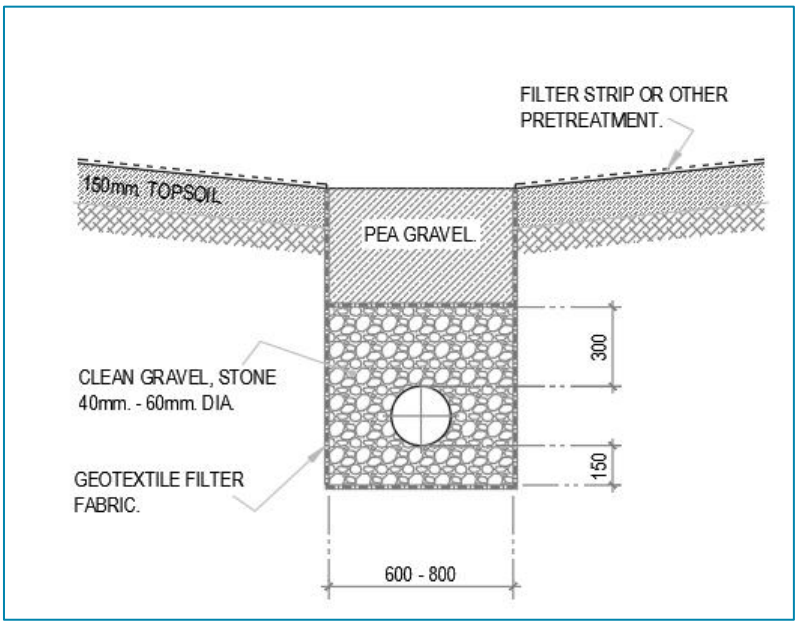


Figure 9: Filter Drain

1.4 Individual Design Packages

The Reference Design of the Luas Finglas was broken into 4 Areas 30,31,32 33. Area 30 covers the existing Broombridge depot building and additional stabling on the Green Line. Area 31 commences at the existing Broombridge depot and finishes at St Helena's Road. Area 31 incorporates the most environmentally sensitive receptors on the project; the Royal Canal, the Tolka River and Tolka Valley Park. Area 32 goes from Tolka Valley Road to Mellowes Road. Area 33 goes from Mellowes Road to the proposed Scheme's terminus at Charlestown. Some detail on these receptors has been provided below. The descriptions of the drainage networks below and the Drainage Drawings in Appendix A are intended to be reviewed in tandem.

1.4.1 Area 30-Drainage Network 1: Broombridge Depot to High point of Royal Canal Bridge

The network extends from the Royal Canal Bridge to the Broombridge Depot. The track type in this network is embedded trackform. Drainage of the rails and the adjacent pavement will be achieved by slot drain systems whereby there is a drainage system within the rails themselves.

The slot drainage system involves providing a rail grooved drain at intervals of 50m and a cross track drain (slot drain collection channel) every 150m, at low points and before each pedestrian crossing or road junction at which the rail line intersects. The precise locations of the outfall points from the track rail system will be determined during detailed design.

When the slot drains reach capacity, they will outfall to a separate piped system which will act as the collection conveyance mechanism. See Figure below which presents a detail of the collection system from the slot rail. A channel detail which runs perpendicular to the line of the rails such as this is provided at locations where the rail system outfalls to a piped collection system. The covers on these channels are removable which allows for desilting and maintenance.

In the vicinity of the Broombridge Depot there is an existing geocellular attenuation tank system (82m x 7.0m x 2.0m). A new oversized attenuation pipe will be provided in advance of the geocellular unit. A flow control will be placed at the outlet of the oversized attenuation pipe before the flows from the new network join the existing drainage system. This will limit the outflow from the new drainage network while keeping all downstream infrastructure in place.

Area 30 also incorporates a LRT stabling area which consists of 4 tracks laid parallel to each other. The most southern track run is an embedded track form. The three tracks to the North of this are primarily ballast embedded track. The drainage of the embedded track is via the rail grove drainage as described previously. The tracks in ballast will be drained via infiltration trench. All track drainage in the stabling area discharge flow towards the new attenuation pipe previously described.

The Royal Canal Bridge has been designed in consultation with Waterways Ireland who have approved the proposal. For details in relation to the flooding assessment with respect to the Royal Canal, refer to the proposed Scheme's Flood Risk Assessment Appendix A10.2 in Volume 4 of the EIAR.

Figure 10: Detail of Slot Drain Collection Channel

1.4.2 Area 31-Drainage Network 2: Royal Canal River Bridge to Tolka Valley Road

This network commences at the high point of the proposed Royal Canal Bridge and finishes at the River Tolka. This drainage network will accommodate the drainage system from the rails and will also drain the existing Broombridge Road and the proposed pedestrian footpaths and cycle tracks. As this network starts and ends at new bridge structures, the portions of the rails within the extents of these bridge decks will be drained using slot drain systems within the rails itself, similar to what will be used in Network 1 above (See Figure). Refer to Figure below, which indicates how the rails along the River Tolka Bridge will be drained using drop manholes connecting with the proposed pipe infrastructure beneath the adjacent road.

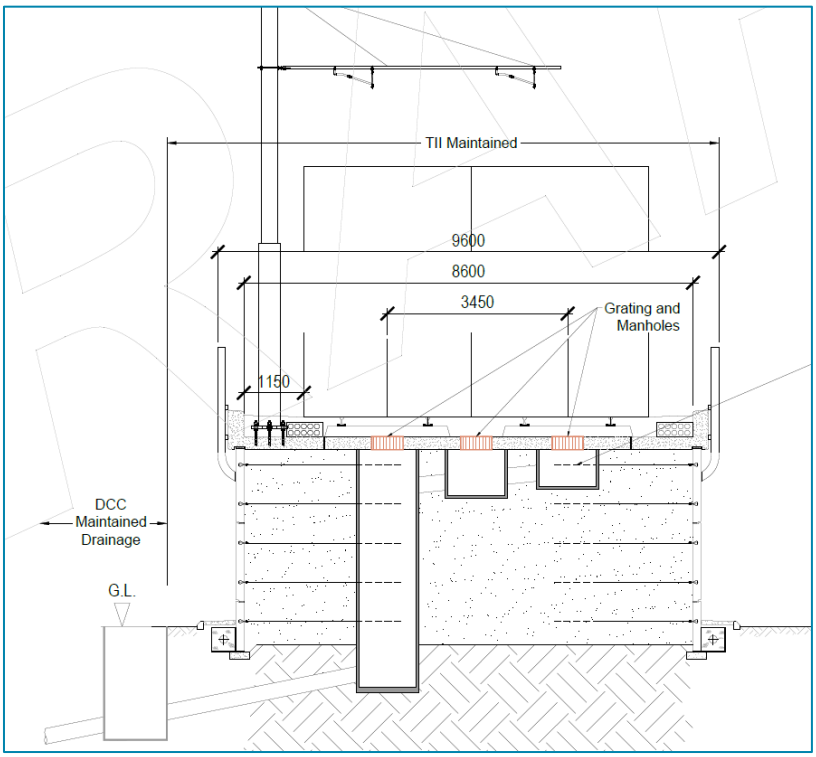


Figure 11: Section through embankment of River Tolka Bridge Structure

For the cycle tracks and pedestrian paths where possible the surface will be sloped to allow the surface water to a SuDS based system in the form of a linear tree pit run.

To co-ordinate the proposed new rail with the existing road, it is necessary to realign the existing Broombridge Road. As a result, some of the existing stormwater sewer on Broombridge Road will require relocation. A dedicated main collector conveyance pipe for the rail track, Broombridge Road and both the pedestrian paths and cycle tracks will be provided and located on the western side of the Broombridge Road. The surface water from the cycle track and pedestrian paths will flow over the surface to an adjacent linear run of tree pits which will provide some attenuation and improvement in water quality. These tree pits will be of the Stockholm tree pit design. The tree pits shall be planted with species that can tolerate a regime of both flooding and drought. These native and naturalised species will enhance biodiversity in the region. Planting within the tree pits will be selected to withstand any saline water which may be present as a result of road gritting.

The surface water on the upper part of the elevated track will be collected and discharge directly to the new collector drain on Broombridge Road but the lower section of the elevated track ramp, close to Lagan Road is planted which will improve water quality and reduce the flow rate. The at-grade track on Broombridge Road is mostly of planted track type except for at road junctions.

For the trafficked area of the realigned Broombridge Road, a sealed drainage system will be provided in the form of kerb and gullies. Indicative locations for gullies have been provided on the layout drawings in Appendix A, but the final locations will be determined during the detailed design process.

The gradient on this network falls towards the Ballyboggan Road/Tolka Stream. At the downstream (Northern end) of this network, attenuation will be provided in the form of an attenuation pipe which will connect with the existing surface water network in the region. The flows from the new attenuation pipe, will be reduced so that they are lower than the predevelopment flow levels. The attenuation pipe will incorporate a hydro brake or similar flow reducing device. The downstream manhole of the attenuation pipe will also incorporate a pollution shut off device, so that flows can be contained in the attenuation pipe.

1.4.3 Area 31/32 Drainage Network 3: Tolka River Bridge to St Helena's Road

This network runs from St Helena's Road (The high point) to the Tolka River (The low point). St Helena's Road runs perpendicular to the alignment of the proposed tracks. The existing drainage system along St Helenas Road will be reused, but the gulley locations will be adjusted to fit better with the new alignment. Overland flow, together with runoff from cycleway and footpaths will be collected via filter drains.

The track system in this network runs through the open green space of Tolka Valley Park and is proposed to be of green trackform. This will allow the stormwater from the track area drain to ground and any stormwater which exceeds the infiltration capacity of the ground beneath will be collected by a collection system of lateral infiltration trenches and pipes and will flow in a southerly direction towards the proposed attenuation wetland. The track drainage system will be as per Detail D on drawing LDD101-BEV-GN-ROUT-XX-DR-CD-00001.

Finglaswood Stream

The route of Finglaswood Stream is indicated on the Drainage Layout Drawings. At present the Finglaswood Stream is culverted. The potential of daylighting this stream was considered during the reference design, but due to the stream's depth, it was considered that it was not feasible; the CCTV survey indicated that the culverted stream was 7 meters deep in places. An assessment of the schemes impact on the Finglaswood Stream is provided in Chapter 10: Water of Volume 2 of the EIAR.

Tolka Wetland

The existing regime involves treatment to the surface waters emerging from the Finglaswood Stream, prior to their outfall to the Tolka River, an Integrated Constructed Wetland (ICW) was constructed. The ICW consists of a primary and a secondary cell, of length to width ratio of 4:1. Further to undergoing treatment in the cells, the waters discharge to a small lake and ultimately to the Tolka. During times of low flow surface waters within the Finglaswood Stream is directed to the ICW, larger flows are diverted directly to the River Tolka. In accordance with the data on the EPA website, The River Tolka (Tolka_05) is currently at Risk. The treatment flow through the wetland cells and lake, is in the opposite direction to the Tolka River which flows West to East. The drainage layout drawings indicate the ICW (Integrated Constructed wetland) Cells, and the extents to which it is currently affected by the proposed River Tolka River Bridge.

A series of consultations were held with DCC Parks and DCC's Drainage Division. As a result of these meetings, it was decided to commission the Environmental specialists VESI, to assess the schemes impact on the ICW. VESI were the ICW's original designers. To offset the schemes impact on the ICW, the following mitigation works have been proposed by VESI. Refer to Appendix A10.4 in Volume 4 of the EIAR for the report prepared by VESI. The mitigation works consist of the following:

- Increase the plan area of Cell 1 to the North and to the South. This will act as compensation for the Eastern Section of the ICW that has been impacted by the Tolka river Bridge;
- Relocate the inlet to the ICW, as the original location will be impacted by the River Tolka Bridge;
- Rebuild the bund between the ICW and the lake at the Western extent of the ICW. This bund is currently failing; and
  Remove unsuitable species from the bed of the ICW, and replant with ones which are more suitable and will improve the functionality of the ICW.

Figure 6: Aerial View of Integrated Constructed Wetlands

1.4.4 Area 32-Drainage Network 1-St Helena's Road to Wellmount Road

This network commences at St Helena's Road and extends to Wellmount Road. The proposed horizontal alignment for the track runs through existing green space which currently hosts local amenities in the form of pedestrian footpaths and both a soccer and GAA playing pitch at the southern end of this network.

The proposed rail track in this area shall be green trackform and drained as previously described. Prior to discharging to the adjacent existing surface water sewer, the track surface water will be routed through further SuDS features in the form of infiltration trenches and Bioretention Areas.

The playing pitches will be re-aligned and provided with a new subsurface drainage system, the details of which will be determined during the detailed design stage. A large infiltration trench has been provided to cater for the stormwater discharge from each pitch. These infiltration trenches will have an overflow to the Finglaswood Stream.

The paved pedestrian tracks currently in this green space have been redesigned to allow for the relocation of the playing pitches. Drainage to these relocated pedestrian tracks is provided in the form of filter drains adjacent to the paved surface. These filter drains discharge to the infiltration trenches as described previously.

The works also include updates to the design of part of St Helena's Road and Farnham Drive. The existing stormwater sewer will be reused in this region, as there is no increase in paved areas. Existing gully positions may be repositioned to facilitate drainage of the realigned pavement.

Where the rail track alignment crosses Wellmount Road the trackform reverts to embedded track. A track cross drain will be provided on the high side of the rail crossing (Northern Side) and at the embedded track low point. The water from the embedded track is routed through infiltration trench which is positively drained to an adjacent stormwater sewer.

1.4.5 Area 32-Drainage Network 2-Wellmount Road to Mellowes Road

The trackform type from Wellmount Road to Mellowes Road is mainly green trackform which provides drainage and SuDS treatment to the surface water. As with the other networks on the scheme the water discharged from the green trackform is routed through an infiltration trench before discharging to the

adjacent existing surface water sewer. The trackform changes to embedded trackform at the northern end of the network adjacent to the Ravenscourt residential development and extends to the Mellowes Road Junction. This embedded trackform will discharge to an infiltration trench located in the green space to the east of Cardiff Castle Road which is positively drained to the existing stormwater sewer on the Cardiff Castle Road.

Realignment works are also proposed for the Patrickswell Road to facilitate space for the rail track alignment. Drainage to the new Patrickswell Road will be provided in the form of a kerb and gully system which will discharge to a new 225mm stormwater sewer in the proposed road. This pipe will discharge to the existing stormwater sewer at the junction of Wellmount Road and the new Patrickswell Road.

Between Wellmount Road and Cappagh Road a footpath is proposed north of the track alignment. There is a green space proposed between the green track and the footpath in which a filter drain will be located. This will provide both drainage and SuDS treatment to the footpath surface water runoff. Stormwater in the filter drain which does not infiltrate to ground will pass through a second SuDS feature in the form of an infiltration trench before discharging to the new 225mm stormwater sewer on Patrickswell Road as discussed above.

On the southern side of the Patrickswell Road a footpath is proposed. Between the Wellmount Road junction and the Little Sisters of the Assumption entrance, the footpath slopes away from the road. The surface water is collected by an adjacent filter drain which discharges to an infiltration trench at the Wellmount Road end which discharges to the new 300mm stormwater sewer on Patrickswell Road.

North of the Little Sisters of the Assumption entrance the slope on the footpath changes to a fall towards the road. This facilitates collection of the surface water in a filter drain between the footpath and Patrickswell Road. Further north the surface water flows towards the road and is collected by the Patrickswell Road drainage system.

The Cardiff Castle Road/Finglaswood Road will be realigned to facilitate a vehicular entrance to the Finglas Garda Station. The existing road gullies will be relocated to collect surface water and will discharge to the existing drainage system. The proposed new footpath adjacent to Cardiff Castle Road slopes towards the road and the surface water will also be collected by the existing drainage system. The footpath north of the LRT from the Ravens Court development to the Mellowes Road Junction shall drain towards the track and the surface water shall be collected by the embedded track drainage system.

Cycle tracks are also proposed each side of the new Patrickswell Road. These cycle tracks slope towards the road so any surface water will be collected by the road drainage system.

The existing Finglas Road Garda Station parking arrangement to the south of the building will be revised and a new entrance from Finglaswood Road provided while closing the current vehicular entrance on Mellowes Road. The drainage system will be updated to match. Within the car park surface water from paved areas will be collected via Kerb and gully in hard standing road areas with pervious paving provided to the parking pays. The collected water will be piped to a bio-retention feature in the grassed area to the south of the site with a fuel/oil interceptor provided upstream of the bio-retention area. Outflows will be limited to greenfield runoff rates with a vortex flow control device installed downstream of the attenuation. The outfall for the Finglas Garda Station drainage system is via a new manhole to be constructed on the existing stormwater sewer located north of the Ravenscourt crossing.

The Finglas Garda Station overflow car park east of the Luas track will be extended. The existing drainage shall be preserved and any additional surface water on newly paved area shall be directed to the existing gullies.

1.4.6 Area 32/33-Drainage Network 3-Mellowes Road to Mellowes Park

From the Mellowes Road junction to the east of the Mellowes Road Luas Stop embedded trackform is proposed. The embedded track is drained via the rail groove drainage in the manner previously outlined.

The water which discharges from the track is collected via an existing collector drain which runs parallel to the track alignment on Mellowes Road.

East of the Mellowes Road Luas Stop to the Mellowes Park entrance the track returns to green trackform. As outlined earlier, any water that does not infiltrate to ground is collected by the perforated pipes in the fill material beneath the track. These will flow to an infiltration trench located adjacent to the track and ultimately discharge to an existing stormwater sewer at the entrance to Mellowes Park.

The carriageway at Mellowes Road shall be drained via kerb and gully and discharge to the existing stormwater sewer adjacent to the carriageway as per existing condition with adjustments to gullies being completed as required.

On the south side of Mellowes Road Stockholm tree pits will be provided at selected locations. Where possible, surface water from cycle track and footpaths will be directed to these tree pits. Any surface water which cannot enter a tree pit shall via a gully discharge to the storm water sewer to the north of Mellowes Road.

Additional car parking is being provided on the north side of Mellowes Road opposite Finglas Garda Station. Surface water here shall be directed to the new tree planting around its perimeter which will ultimately discharge to the stormwater sewer north of Mellowes Road.

Any surface water on the access road between Mellowes Road and Mellowes Park will be collected via gullies and be routed to a bio-retention area in the green area adjacent to Mellowes Road before discharging to the existing stormwater sewer on Mellowes Road.

1.4.7 Area 33-Drainage Network 1 Mellowes Park

Area 33 commences at the southern end of Mellowes Park on the Finglas Road (R135) side of the park and runs directly north for a distance of approximately 520m. Mellowes Park is a medium sized urban park which provides recreational space in addition to playing pitches and playgrounds.

In keeping with the drainage strategy of the broader scheme SuDS features will be utilised within Area 33. It is intended to provide stormwater drainage in the Mellowes Park region using 3 elements of the SuDS treatment train.

Initially green trackform will be used, similar to that indicated in Figure 7 below which will facilitate infiltration to ground and an element of stormwater attenuation and treatment. The collected surface water will be routed to a second SuDS treatment element in the form of an infiltration trench before passing to the third SuDS feature in the form of a bio-retention area. Flow controls will be provided at the outlet of the bio-retention areas to aid with attenuation and water quality. The bio-retention areas shall be positively drained by means of a connection to the existing surface water drainage infrastructure in the region.

Figure 7: Image of Existing Green Track (Dublin) Configuration

1.4.8 Area 33-Drainage Network 2-St Margarets Road (Mellowes Park Footpath to McKee Avenue)

At the northern end of Mellowes Park the environment of the proposed track changes from urban parkland to paved roadway. Adjacent to the overhead pedestrian footpath, the trackform changes from green to embedded trackform and terminates at the current McKee Avenue Roundabout.

The drainage is provided using the slot drainage system. As infiltration of the surface water to ground is not possible where the embedded trackform is used, SuDS treatment of the surface-water is provided by routing the collected surface water through the adjacent SuDS features such as infiltration trenches, bioretention rain gardens or tree-pits. Where possible SuDS features have an outfall to the existing drainage infrastructure in the region.

In certain locations the flow path of the surface water towards the kerbing inlet is obstructed, for example by the presence of a cycle lane or there not being a rain garden available for SuDS treatment. In such a case, the surface water is collected using road gullies and piped to the nearest bioretention area/rain garden. None of the proposed surface water gullies have a contributing catchment larger than 200 square meters, in accordance with the Greater Dublin Regional Code of Practice (GDRCOP). Gullies are also provided at pedestrian crossings and at local low points. Where provided at low points, double gullies are proposed.

The footpaths in this region are sloped towards the rain gardens. Refer to Drg No. LDD101-BEV-RD-GZ33-ZZ-DR-CD-00010 for the proposed drainage layout.

A Luas Stop is located on St Margaret's Road adjacent to McKee Avenue. As with all Luas Stop platforms it is sloped away from the tracks. The platform is constructed with permeable paving with a dished channel to the rear and a gully provided for redundancy. All platform drainage systems are positively drained to an existing stormwater sewer. The north side of the St Margarets stop has trees proposed at the platform. The dished channel slopes to allow surface water flow to the tree pits before discharging to the existing stormwater sewer. The adjacent cycle track in this region slopes towards the Luas Stop platform forming a

shallow grade v channel between the two pavements. At the low point in this region the surface water is collected via a gully and piped to the adjacent raingarden.

On the eastern side of the Finglas Road north-east of the Lidl store a multi-storey park and ride facility is proposed. There is no increase in hardstanding as a result of this development and the stormwater will discharge to the existing stormwater sewer in the central reserve of the Finglas Road.

Additional trees will be planted in the current green verges of the Finglas Road. The footpaths will allow over the edge drainage to the tree pits on both sides of the Finglas Road which will then discharge to the stormwater sewer mentioned above.

1.4.9 Area 33-Drainage Network 3-McKee Avenue

The McKee Avenue Road surface is super elevated directing the surface water to the north-east direction towards the kerb where it is collected via gullies. The footpath and cycle track to the south-west drain onto the road. On the north-east side of McKee Avenue, the footpath and cycle track drain over the edge to the adjacent bioretention rain gardens. In one location a small pocket raingarden is situated between the proposed footpath and cycle track. In this case the small, isolated rain garden is linked to the larger adjacent rain garden which discharges to the existing storm water drainage infrastructure on McKee Avenue.

A new road is proposed from McKee Avenue to the rear of the Murdocks Builders Merchants/Manhattan Peanuts buildings. The slope on this road will be to the south towards McKee Avenue. Surface water will be collected via kerb and gulley and a new carrier drain will be constructed in the carriageway which discharges to the stormwater sewer on McKee Avenue.

1.4.10 Area 33-Drainage Network 4-St Margarets Road (McKee Avenue to McKelvey Celtic AFC)

Track drainage form the current McKee Avenue roundabout to McKelvey Celtic AFC reverts to green trackform and the storm water is routed through the tree pit/rain garden located adjacent to the track. These SuDS features are also positively drained to the existing stormwater sewer in the region. In two locations the trackform changes from grass to embedded, firstly at the entrance to the Jamestown Business Park opposite McKelvey Road and also at the more northern Jamestown Business Park entrance. This is to facilitate vehicle crossing points and drainage is provided as outlined previously for embedded trackform SuDS opposite McKelvey Avenue The collected surface water will pass through an adjacent bioretention rain garden before discharging to the existing surface water infrastructure in the vicinity. At the Jamestown Business Park entrance opposite McKelvey Avenue, a new water sewer will be constructed which will receive flows from the realigned St Margarets Court parking layout.

St Margarets Court originally had an access directly onto St Margarets Road which has been relocated to the Jamestown Business Park Road and the original entrance closed off. The drainage will also be realigned and will incorporate pervious paving to the parking bays, a bio-retention facility in the green area to aid with attenuation and improvement of water quality, a petrol interceptor and flow control device.

Any surface water east of the track at the realigned Jamestown Business Park Road (northern entrance) will be collected via gullies and discharge to the existing adjacent stormwater sewer.

The road surface water on St Margarets Road is collected via gullies and drains to the existing stormwater sewer in the area. There are tree pits and rain gardens north of McKelvey Road which will provide treatment to the west of St Margaret's Road. The footpath and cycle lane is sloped towards the road which will allow over the edge drainage of the surface water to the SuDS features. Where such SuDS features are not available surface water will be collected by the road drainage system.

The surface water on the footpath to the east of St Margaret's Road flows towards the LRT and is collected by the rail drainage. The surface water from the cycle lane located between the rail line and St Margaret's Road will flow over the edge to the adjacent rain gardens and tree pits. Where a rain garden is not available surface water will be collected by the road drainage system.

Newly positioned road gullies will provided be provided on the McKelvey Avenue junction to facilitates surface water removal.

1.4.11 Area 33-Drainage Network 5-St Margaret's Road (McKelvey Celtic AFC to Melville Road Junction)

The trackform in the region is predominantly green trackform with a segment of embedded trackform at the Charlestown Luas Stop adjacent to the Century Business Park. As per the drainage design strategy, SuDS treatment is provided to the embedded track region by routing the collected surface water through the adjacent rain gardens before discharging to the existing stormwater infrastructure.

This section of St Margaret's Road is drained in the same manner as previous sections. The surface water from the trafficked road is collected with gullies and piped to the existing storm water sewer.

The footpath and cycle track on the western side of St Margaret's Road fall in the direction of the main road and drains over the edge to the adjacent rain garden before discharging to the existing sewer. Where a rain garden is not available for surface water to access, the footpath flows onto St Margaret's Road and is collected by the road drainage.

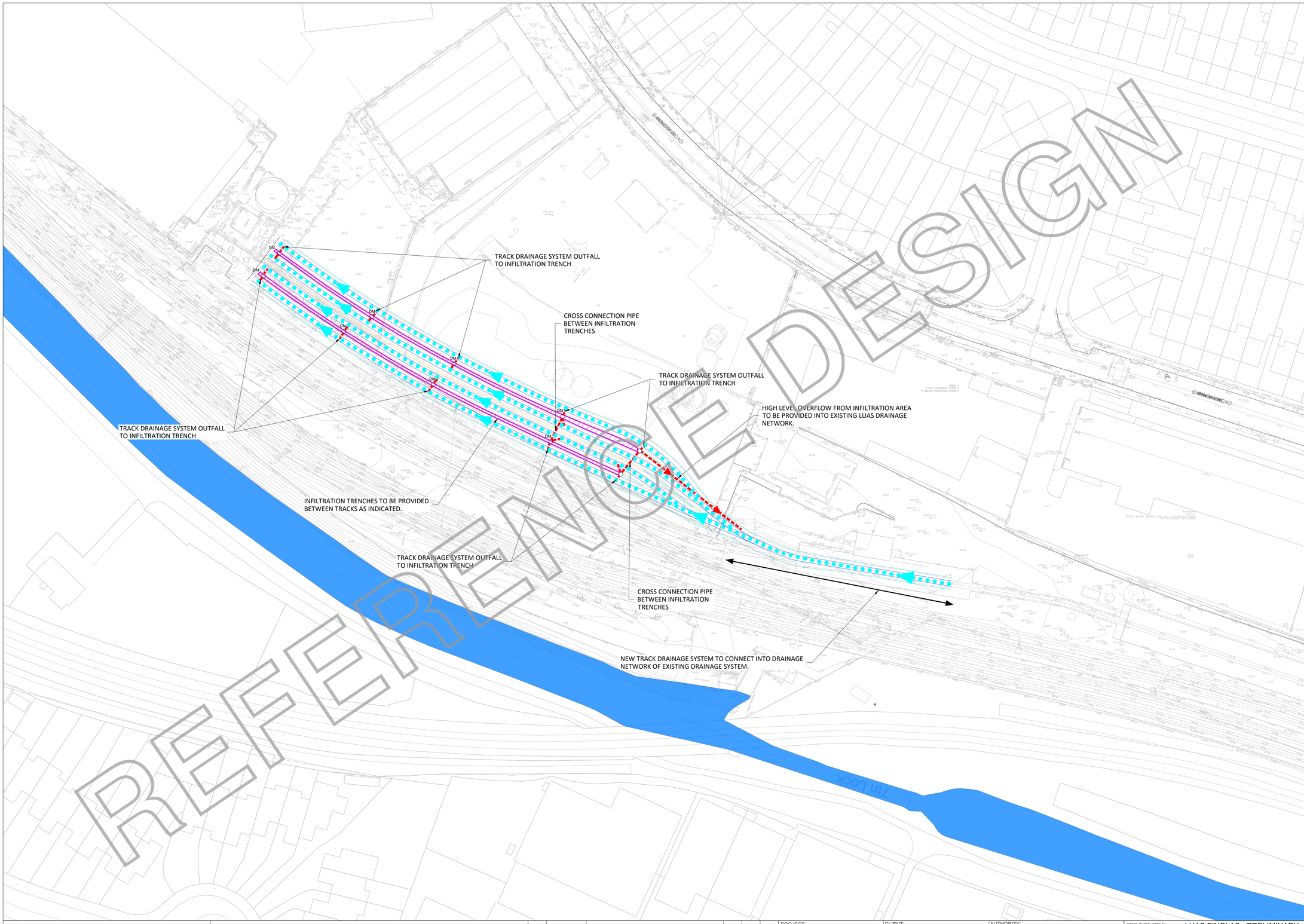
Similar to the St Margaret's Road stop further south, the Luas Stop platform drains away from the rail line towards the adjacent footpath. The footpath also falls towards the platform creating a shallow V-dish. Tree pits are provided to collect the surface water and provide SuDS treatment. These tree pits are linked via a drainage pipe to optimise volume available to each tree and are positively drained, initially to the adjacent rain garden which then drains to the stormwater sewer.

The updates proposed for the St Margaret's Road/Melville Road junction to facilitate the project result in the need to update the current drainage design. A similar design philosophy to that on St Margaret's is adopted. Surface water from the trafficked road is collected by gullies and discharges to the existing stormwater network on Melville Road and similarly on Charlestown Place. Gullies are provided at low points or where the area of surface water collected approaches 200m^2. Proposed footpaths and cycle tracks slope towards the road which allow over the edge drainage into the rain gardens where available. If no rain garden is present this surface water flows on the road and is collected via the Melville Road drainage system.

1.5 Summary

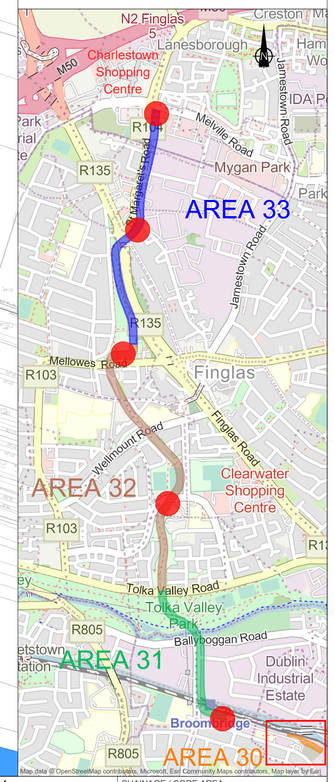
The drainage design for Luas Finglas has been developed in conjunction with DCC Drainage Department, Fingal County Council and all other stakeholders. The design will incorporate the lessons learned from the previous Luas works via input from the TII. The design is keeping with TII design standards and guidance documents, and the document 'Sustainable Drainage design and Evaluation Guide 2021, the Greater Dublin Regional Code of Practice for Drainage Works and the Greater Dublin Strategic Drainage Study as published by Dublin city Council.

Appendix A. Drainage Design Drawings



LEGEND:

- Carrier Drain
- Carrier Drain
- Perforated Drainage Pipe
- Infiltration Trench
- Track Drainage system
- Filter Drain
- ACO Channel (Pedestrian)
- Proprietary slot based track drainage system
- ACO Drain or similiar traverse track drainage system
- Dished Paving
- Existing Surface Water Pipe and Manholes
- Existing Foul Sewer and Manholes
- Lakes, rivers and canals
- ICW Cells
- Cell affected by bridge
- Compensation Storage Area
- ICW
- Access point
- Catchpit Chamber
- Distribution Manhole
- Road Gully
- Side Inlet
- Petrol Interceptor
- ICW Connection Pipes
- Bioretention Area
- Existing tree maintened
- Proposed street tree
- Proposed tree grouping



REV	DATE	DESCRIPTION	BY	CHK	APPD
P01	2022-04-06	ISSUED TO TII FOR REVIEW	RF	MG	ED
P02	2022-07-06	ISSUED TO TII FOR REVIEW	FB	ROB	ED
P03	2023-06-21	REFERENCE DESIGN	MG	ND	GD
P04	2023-11-08	REFERENCE DESIGN	MG	ROB	GD
P05	2023-12-21	REFERENCE DESIGN	MG	FB	ED
P06	2024-10-02	REFERENCE DESIGN	MG	FB	JPH

PROJECT: LUAS FINGLAS

CLIENT: Iompair Éireann Transport Infrastructure Ireland — Ionad Gnó Ghaita na Páirce, Bóthar Átha Cliath 6, Éire; Parkgate Business Centre, Parkgate Street, Dublin 8, Ireland, D08 DK10; Phone +353 1 646 3600; www.tii.ie

AUTHORITY: NTA — Údarás Náisiúnta Iompair, National Transport Authority

CONSULTANT: BARRY TRANSPORTATION; egis

DRAWN:	CONTENT CHECK:	QUALITY CHECK:	APPROVED:	DATE:
M.Galeza	F.Weber	U.Fitzmaurice	J.Phan-Hoang	2024-10-02

SCALES: 1:500

DRAWING STATUS: Suitable for review and comment

PROJECT TITLE: LUAS FINGLAS - PRELIMINARY DESIGN & STATUTORY PROCESS

PROCUREMENT REF: LDD101

CHAINAGE / CORE AREA:

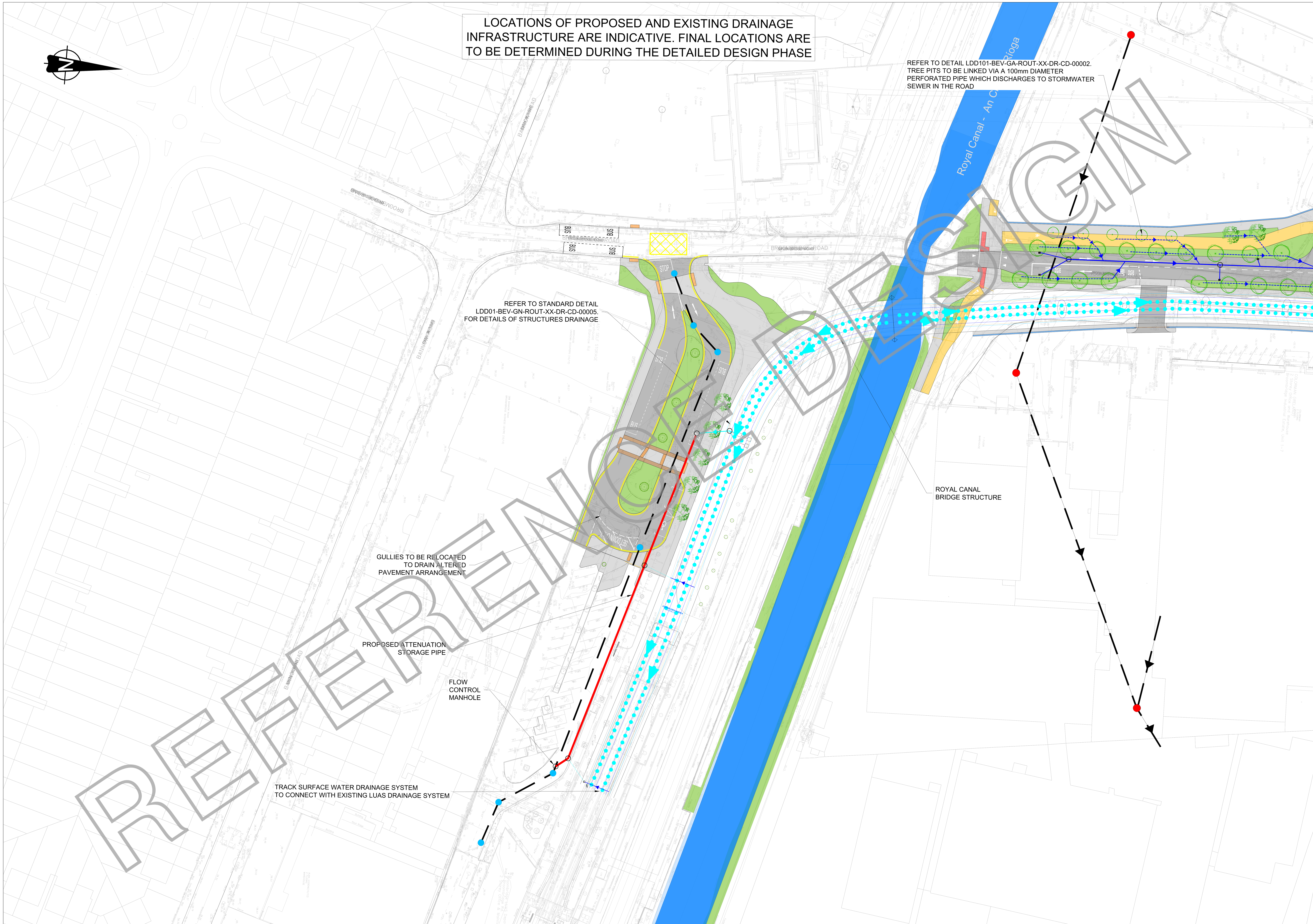
BASE MODEL REF:

DRAWING TITLE: DRAINAGE NETWORK AREA 30 SHEET 1

FILE NAME: LDD101-BEV-RD-GD03-ZZ-DR-CD-00001

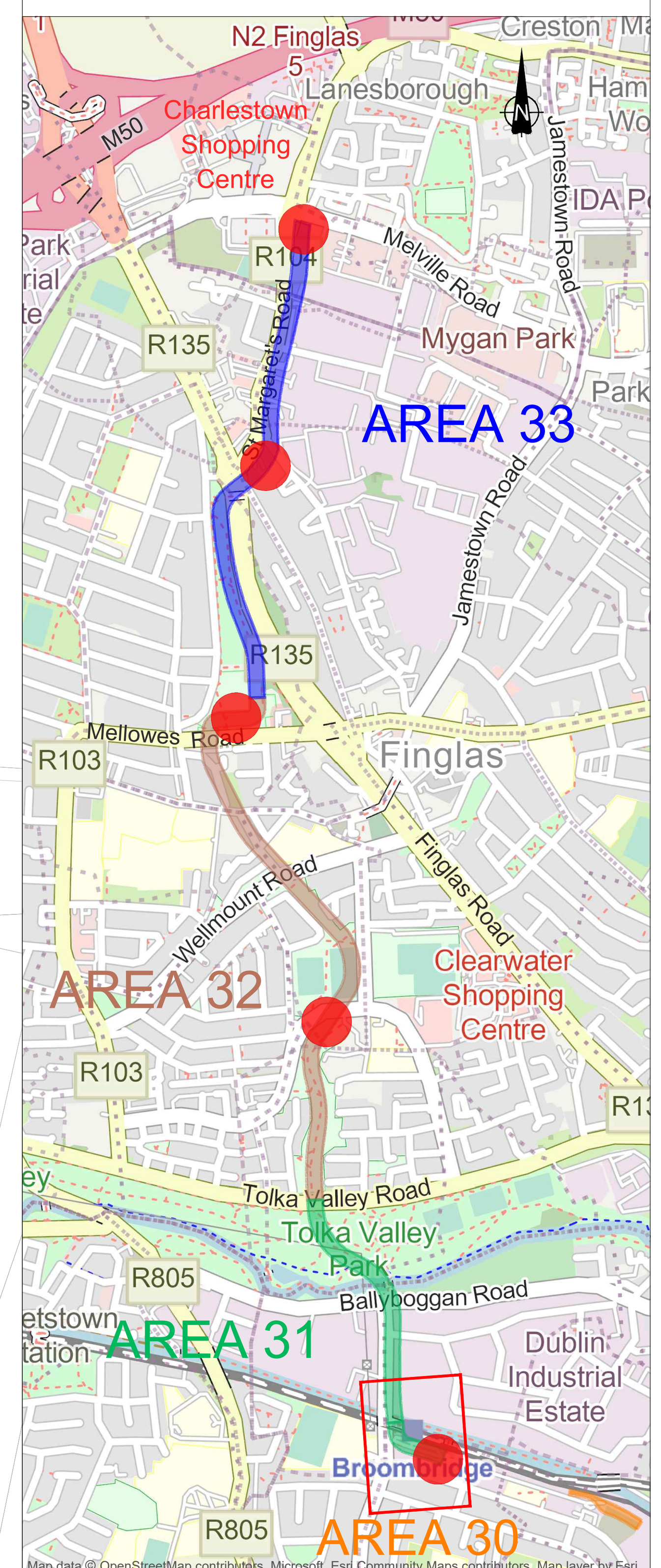
SUITABILITY: S3

REVISION: P06



LEGEND:

- Carrier Drain
- Carrier Drain
- Perforated Drainage Pipe
- Infiltration Trench
- Track Drainage system
- Filter Drain
- ACO Channel (Pedestrian)
- Proprietary slot based track drainage system
- ACO Drain or similiar traverse track drainage system
- Dished Paving
- Existing Surface Water Pipe and Manholes
- Existing Foul Sewer and Manholes
- Lakes, rivers and canals
- ICW Cells
- Cell affected by bridge
- Compensation Storage Area
- ICW
- Access point
- Catchpit Chamber
- Distribution Manhole
- Road Gully
- Side Inlet
- Petrol Interceptor
- ICW Connection Pipes
- Bioretention Area
- Existing tree maintened
- Proposed street tree
- Proposed tree grouping



All elevations are in metres and relate to Geoid Model (OSGM02) Malin Head as defined by existing Project Control. All Co-ordinates are in Irish Transverse Mercator Grid (ITM) as defined by VRS active GNSS station Tallaght College (TLLG).

REV	DATE	DESCRIPTION	BY	CHK	APPD
P04	2022-07-06	ISSUED TO TII FOR REVIEW	FB	ROB	ED
P05	2023-03-07	FOR INFORMATION	MG	ROB	ED
P06	2023-06-21	REFERENCE DESIGN	MG	ND	GD
P07	2023-11-08	REFERENCE DESIGN	MG	ROB	GD
P08	2023-12-21	REFERENCE DESIGN	MG	FB	ED
P09	2024-10-02	REFERENCE DESIGN	MG	FB	JPH

PROJECT: LUAS FINGLAS

CLIENT: Bonneagar Iompair Éireann / Transport Infrastructure Ireland
Ionad Gnó Gheata na Páirce
Sráid Gheata na Páirce
Baile Átha Cliath 8, Éire
Parkgate Business Centre
Parkgate Street
Dublin 8
Ireland, D08 DK10
Phone +353 1 646 3600
www.tii.ie

AUTHORITY: NTA Údarás Náisiúnta Iompair / National Transport Authority

CONSULTANT: BARRY TRANSPORTATION; egis

DRAWN:	CONTENT CHECK:	QUALITY CHECK:	APPROVED:	DATE:
M.Galeza	F.Weber	U.Fitzmaurice	J.Phan-Hoang	2024-10-02

SCALES: 1:500
DRAWING STATUS: Suitable for review and comment

PROJECT TITLE: LUAS FINGLAS - PRELIMINARY DESIGN & STATUTORY PROCESS
PROCUREMENT REF: LDD101
CHAINAGE / CORE AREA:
BASE MODEL REF:

DRAWING TITLE:
DRAINAGE NETWORK
SHEET 1
AREA 31

FILE NAME: LDD101-BEV-RD-GZ31-ZZ-DR-CD-00001
SUITABILITY: S3
REVISION: P09

LOCATIONS OF PROPOSED AND EXISTING DRAINAGE INFRASTRUCTURE ARE INDICATIVE. FINAL LOCATIONS ARE TO BE DETERMINED DURING THE DETAILED DESIGN PHASE

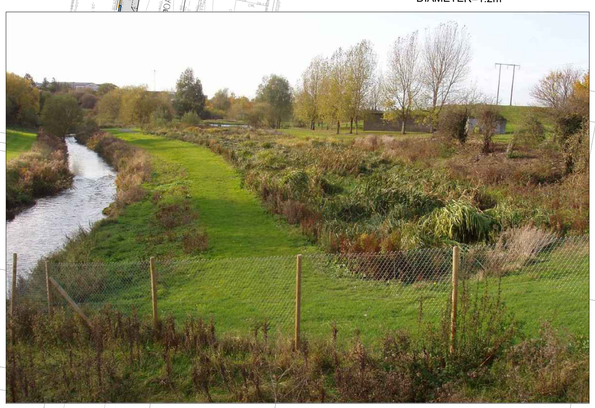
REFER TO DETAIL LDD101-BEV-GA-ROUT-XX-DR-CD-0002. TREE PITS TO BE LINKED VIA A 100mm DIAMETER PERFORATED PIPE WHICH DISCHARGES TO STORMWATER SEWER IN THE ROAD.

NEW SURFACE WATER CARRIER ALONG BROOMBRIDGE ROAD L=238m DIAMETER=225mm TO 375mm

FOR DETAILS OF TRACK DRAINAGE FROM STRUCTURAL EMBANKMENT REFER TO DRAWING NO.LDD101-BEV-GN-ROUT-XX-DR-CD-00005.

BRIDGE EXTENTS

PROPRIETARY SLOT DRAIN DRAINAGE SYSTEM



VIEW OF WETLAND CELL 1 (PRIMARY CELL)

BROOMBRIDGE ROAD SURFACE WATER TO CONNECT TO COMBINED SEWER

OUTFALL NO. 02

HYDROBRAKE FLOW CONTROL CHAMBER OR SIMILAR

OVERSIZED ATTENUATION PIPE L= 31.9m DIAMETER=1.2m

CROSS CONNECTIVITY PIPES BETWEEN CELLS 1 AND 2.

ICW CELL 1 (PRIMARY CELL)

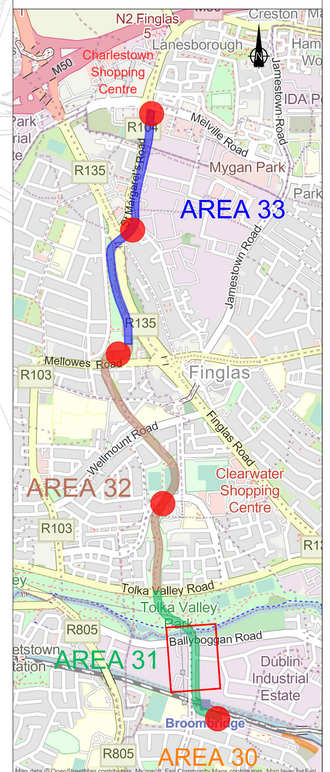
WIDTH OF POND TO BE INCREASED AS INDICATED

PROPOSED ATTENUATION POND TO CONNECT WITH ICW

Tolka River - An Tulcha

LEGEND:

- Carrier Drain
- Carrier Drain
- Perforated Drainage Pipe
- Infiltration Trench
- Track Drainage system
- Filter Drain
- ACO Channel (Pedestrian)
- Proprietary slot based track drainage system
- ACO Drain or similiar traverse track drainage system
- Dished Paving
- Existing Surface Water Pipe and Manholes
- Existing Foul Sewer and Manholes
- Lakes, rivers and canals
- ICW Cells
- Cell affected by bridge
- Compensation Storage Area
- ICW
- Access point
- Catchpit Chamber
- Distribution Manhole
- Road Gully
- Side Inlet
- Petrol Interceptor
- ICW Connection Pipes
- Bioretention Area
- Existing tree maintened
- Proposed street tree
- Proposed tree grouping



REV	DATE	DESCRIPTION	BY	CHK	APPD
P04	2023-03-07	FOR INFORMATION	MG	ROB	ED
P05	2023-06-21	REFERENCE DESIGN	MG	ND	GD
P06	2023-11-08	REFERENCE DESIGN	MG	ROB	GD
P07	2023-12-08	REFERENCE DESIGN	MG	ROB	ED
P08	2023-12-21	REFERENCE DESIGN	MG	FB	ED
P09	2024-10-02	REFERENCE DESIGN	MG	FB	JPH

PROJECT: LUAS FINGLAS

CLIENT: TII Bonneagar Iompair Éireann Transport Infrastructure Ireland — Ionad Gnó Gheata na Páirce, Bóthar Átha Cliath 8, Éire; Parkgate Business Centre, Parkgate Street, Dublin 8, Ireland, D08 DK10; Phone +353 1 646 3600; www.tii.ie

AUTHORITY: NTA Údarás Náisiúnta Iompair, National Transport Authority

CONSULTANT: BARRY TRANSPORTATION; egis

DRAWN:	CONTENT CHECK:	QUALITY CHECK:	APPROVED:	DATE:
M.Galeza	F.Weber	U.Fitzmaurice	J.Phan-Hoang	2024-10-02

SCALES: 1:500

DRAWING STATUS: Suitable for review and comment

PROJECT TITLE: LUAS FINGLAS - PRELIMINARY DESIGN & STATUTORY PROCESS

PROCUREMENT REF: LDD101

CHAINAGE / CORE AREA:

BASE MODEL REF:

DRAWING TITLE: DRAINAGE NETWORK SHEET 2 AREA 31

FILE NAME: LDD101-BEV-RD-GZ31-ZZ-DR-CD-00002

SUITABILITY	REVISION
S3	P09

LOCATIONS OF PROPOSED AND EXISTING DRAINAGE INFRASTRUCTURE ARE INDICATIVE. FINAL LOCATIONS ARE TO BE DETERMINED DURING THE DETAILED DESIGN PHASE

Tolka River - An Tulcha

Pond

EXISTING CONNECTIVITY PIPES BETWEEN ICW CELL 2 AND Pond.

ICW CELL 2 (SECONDARY CELL)

OUTFALL NO. 03

PROPOSED ATTENUATION POND

GULLIES ON TOLKA VALLEY ROAD DISCHARGE TO EXISTING ADJACENT STORM SEWER

OUTFALL NO. 04

NEW MANHOLE ON EXISTING SEWER

BIO-RETENTION AREA

BIO-RETENTION AREA. REFER TO DETAIL LDD101-BEV-GA-ROUT-XX-DR-CD-00004 AND 00005

FLOW CONTROL MANHOLE

DISCHARGE TO EXISTING STORMWATER SEWER

NETWORK 3

NETWORK 2

CONNECTIVITY PIPES BETWEEN ICW CELL 1 AND 2.

ICW CELL 1 (PRIMARY CELL)

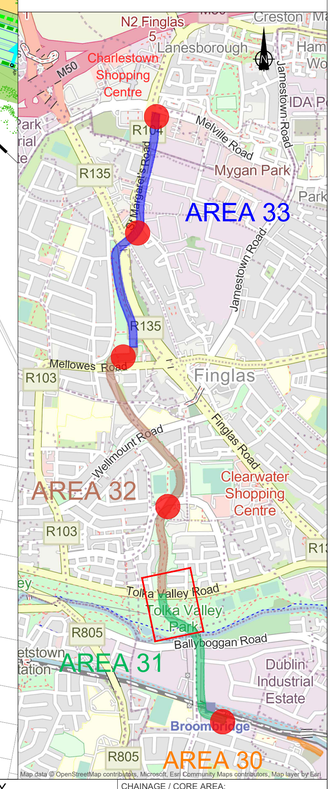
WIDTH OF POND TO BE INCREASED AS INDICATED

PROPOSED ATTENUATION POND TO CONNECT WITH ICW

AERIAL VIEW OF INTEGRATED CONSTRUCTED WETLAND

LEGEND:

- Carrier Drain
- Carrier Drain
- Perforated Drainage Pipe
- Infiltration Trench
- Track Drainage system
- Filter Drain
- ACO Channel (Pedestrian)
- Proprietary slot based track drainage system
- ACO Drain or similiar traverse track drainage system
- Dished Paving
- Existing Surface Water Pipe and Manholes
- Existing Foul Sewer and Manholes
- Lakes, rivers and canals
- ICW Cells
- Cell affected by bridge
- Compensation Storage Area
- ICW
- Access point
- Catchpit Chamber
- Distribution Manhole
- Road Gully
- Side Inlet
- Petrol Interceptor
- ICW Connection Pipes
- Bioretention Area
- Existing tree maintened
- Proposed street tree
- Proposed tree grouping



REV	DATE	DESCRIPTION	BY	CHK	APPD
P04	2023-03-07	FOR INFORMATION	MG	ROB	ED
P05	2023-06-21	REFERENCE DESIGN	MG	ND	GD
P06	2023-11-08	REFERENCE DESIGN	MG	ROB	GD
P07	2023-12-08	REFERENCE DESIGN	MG	ROB	ED
P08	2023-12-21	REFERENCE DESIGN	MG	FB	ED
P09	2024-10-02	REFERENCE DESIGN	MG	FB	JPH

PROJECT: LUAS FINGLAS

CLIENT: TII Iompair Éireann Transport Infrastructure Ireland — Ionad Gnó Ghaeta na Páirce, Sráid Ghaeta na Páirce, Baile Átha Cliath 8, Éire / Parkgate Business Centre, Parkgate Street, Dublin 8, Ireland, D08 DK10 / Phone +353 1 646 3600 / www.tii.ie

AUTHORITY: NTA Údarás Náisiúnta Iompair / National Transport Authority

CONSULTANT: BARRY TRANSPORTATION; egis

DRAWN:	CONTENT CHECK:	QUALITY CHECK:	APPROVED:	DATE:
M.Galeza	F.Weber	U.Fitzmaurice	J.Phan-Hoang	2024-10-02

SCALES: 1:500

DRAWING STATUS: Suitable for review and comment

PROJECT TITLE: LUAS FINGLAS - PRELIMINARY DESIGN & STATUTORY PROCESS LDD101

PROCUREMENT REF:

CHAINAGE / CORE AREA:

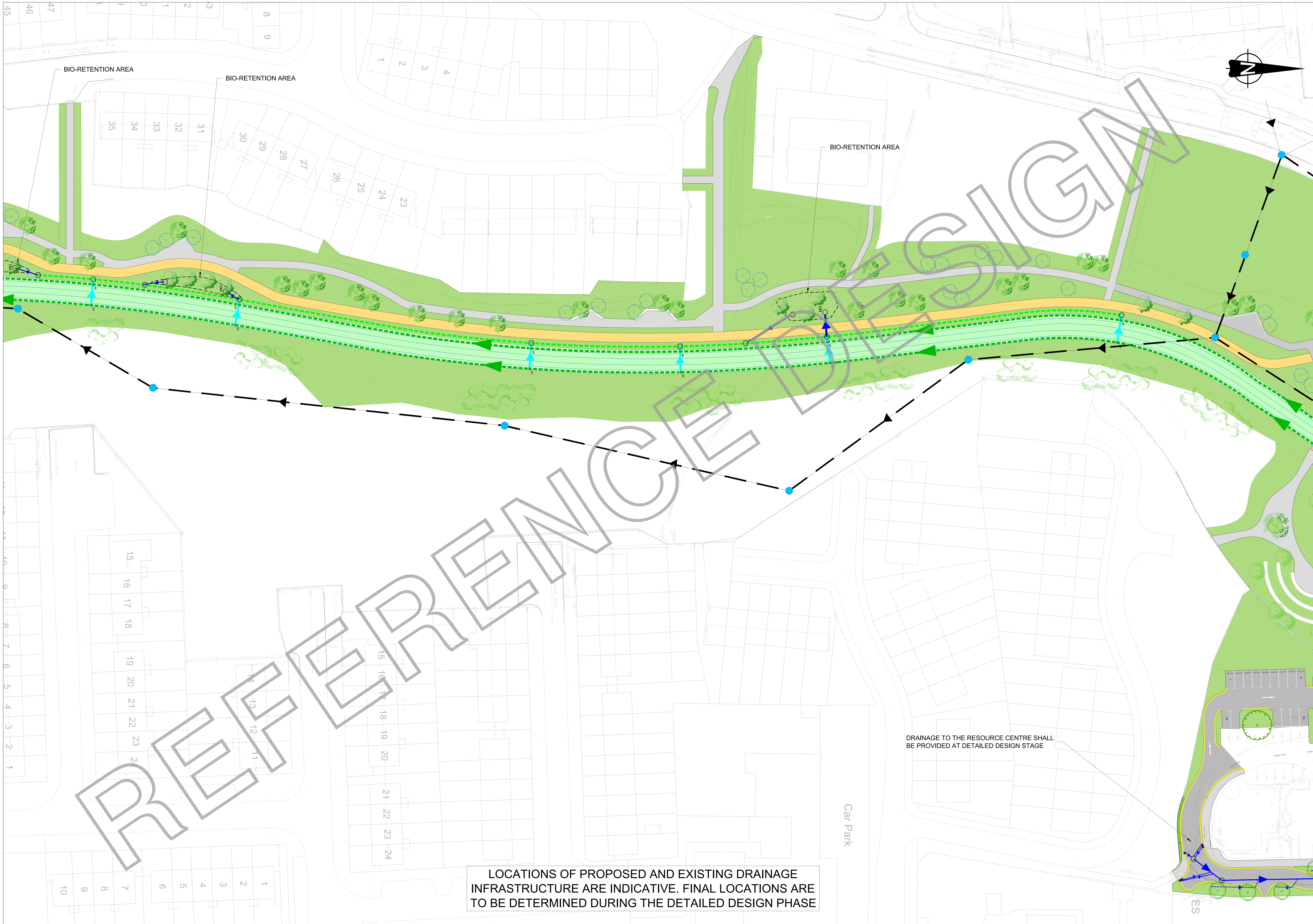
BASE MODEL REF:

DRAWING TITLE: DRAINAGE NETWORK SHEET 3 AREA 31

FILE NAME: LDD101-BEV-RD-GZ31-ZZ-DR-CD-00003

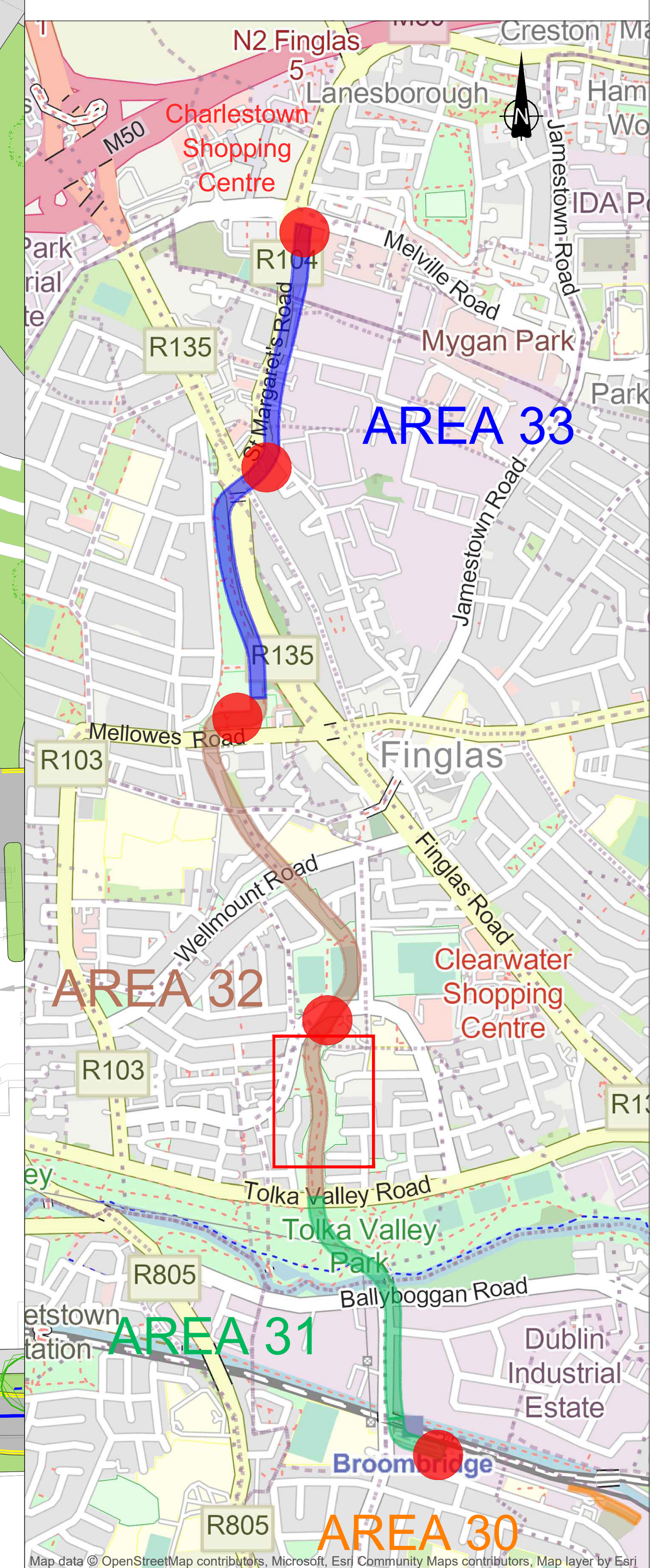
SUITABILITY: S3

REVISION: P09



LEGEND:

- Carrier Drain
- Carrier Drain
- Perforated Drainage Pipe
- Infiltration Trench
- Track Drainage system
- Filter Drain
- ACO Channel (Pedestrian)
- Proprietary slot based track drainage system
- ACO Drain or similiar traverse track drainage system
- Dished Paving
- Existing Surface Water Pipe and Manholes
- Existing Foul Sewer and Manholes
- Lakes, rivers and canals
- ICW Cells
- Cell affected by bridge
- Compensation Storage Area
- ICW
- Access point
- Catchpit Chamber
- Distribution Manhole
- Road Gully
- Side Inlet
- Petrol Interceptor
- ICW Connection Pipes
- Bioretention Area
- Existing tree maintened
- Proposed street tree
- Proposed tree grouping



All elevations are in metres and relate to Geoid Model (OSGM02) Malin Head as defined by existing Project Control. All Co-ordinates are in Irish Transverse Mercator Grid (ITM) as defined by VRS active GNSS station Tallaght College (TLLG).

REV	DATE	DESCRIPTION	BY	CHK	APPD
P03	2022-07-06	ISSUED TO TII FOR REVIEW	FB	ROB	ED
P04	2023-03-07	FOR INFORMATION	MG	ROB	ED
P05	2023-06-21	REFERENCE DESIGN	MG	ND	GD
P06	2023-11-08	REFERENCE DESIGN	MG	ROB	GD
P07	2023-12-21	REFERENCE DESIGN	MG	FB	ED
P08	2024-10-02	REFERENCE DESIGN	MG	FB	JPH

PROJECT: LUAS FINGLAS
CLIENT: TII
AUTHORITY: NTA
CONSULTANT: BARRY TRANSPORTATION, egis

PROJECT TITLE: LUAS FINGLAS - PRELIMINARY DESIGN & STATUTORY PROCESS
PROCUREMENT REF: LDD101
CHAINAGE / CORE AREA:
BASE MODEL REF:

DRAWING TITLE: DRAINAGE NETWORK
SHEET 4
AREA 32

DRAWN:	CONTENT CHECK:	QUALITY CHECK:	APPROVED:	DATE:
M.Galeza	F.Weber	U.Fitzmaurice	J.Phan-Hoang	2024-10-02

SCALES: 1:500
DRAWING STATUS: Suitable for review and comment

FILE NAME: LDD101-BEV-RD-GZ32-ZZ-DR-CD-00004
SUITABILITY: S3
REVISION: P08

EXISTING DRAINAGE TO BOTH PITCHES SHALL BE RETAINED. ANY MODIFICATIONS REQUIRED SHALL BE PROVIDED AT DETAILED DESIGN STAGE

EXISTING GULLY TO BE RETAINED

EXISTING PITCH DRAINAGE TO BE COLLECTED VIA NEW INFILTRATION TRENCH

PROPOSED SOCCER PITCH 90X50m

TYPICAL CROSS SECTION THROUGH PERMEABLE GREEN TRACK DRAWING LDD101-BEV-GN-ROUT-XX-DR-CD-00006

EXISTING GULLIES AND DRAINAGE SYSTEM TO BE RETAINED

PERVIOUS PAVING PROVIDED TO PLATFORM

BIORETENTION AREA

PROPOSED GAA PITCH 136.5x80m

DISH FORMED BETWEEN PAVING SETS TO CONVEY SURFACE WATER ADJACENT TO THE SELF BINDING GRAVEL AREA

BIORETENTION AREA

NO PARKING

BIORETENTION AREA

FLOW CONTROL MANHOLE

FLOW CONTROL MANHOLE

DISCHARGE TO EXISTING STORMWATER MANHOLE

FLOW CONTROL MANHOLE

BIORETENTION AREA

FLOW CONTROL MANHOLE

DETAILED DESIGN OF DRAINAGE TO TAKE ACCOUNT OF ARBORIST REQUIREMENTS

DISCHARGE TO EXISTING STORMWATER CHAMBER

PITCHES STORMWATER TO DISCHARGE TO EXISTNG STORMWATER SEWER ADJACENT TO FARNHAM DRIVE

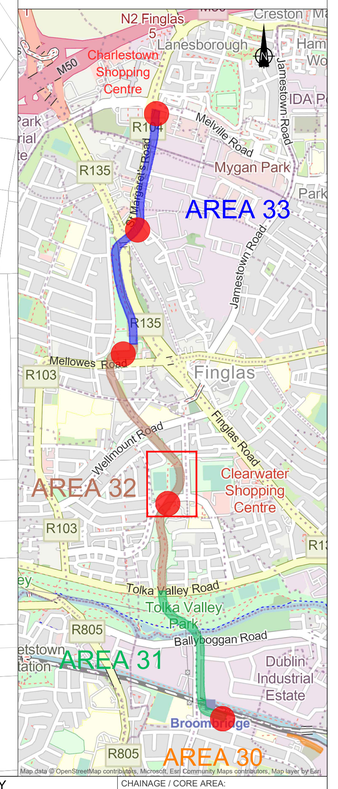
CONNECTION TO EXISTING STORMWATER SEWER

EXISTING DRAINAGE SYSTEM TO BE RETAINED

LOCATIONS OF PROPOSED AND EXISTING DRAINAGE INFRASTRUCTURE ARE INDICATIVE. FINAL LOCATIONS ARE TO BE DETERMINED DURING THE DETAILED DESIGN PHASE

LEGEND:

- Carrier Drain
- Carrier Drain
- Perforated Drainage Pipe
- Infiltration Trench
- Track Drainage system
- Filter Drain
- ACO Channel (Pedestrian)
- Proprietary slot based track drainage system
- ACO Drain or similiar traverse track drainage system
- Dished Paving
- Existing Surface Water Pipe and Manholes
- Existing Foul Sewer and Manholes
- Lakes, rivers and canals
- ICW Cells
- Cell affected by bridge
- Compensation Storage Area
- ICW
- Access point
- Catchpit Chamber
- Distribution Manhole
- Road Gully
- Side Inlet
- Petrol Interceptor
- ICW Connection Pipes
- Bioretention Area
- Existing tree maintened
- Proposed street tree
- Proposed tree grouping



REV	DATE	DESCRIPTION	BY	CHK	APPD
P04	2022-10-20	ISSUED TO TII FOR REVIEW	MG	UF	ED
P05	2023-03-07	FOR INFORMATION	MG	ROB	ED
P06	2023-06-21	REFERENCE DESIGN	MG	ND	GD
P07	2023-11-08	REFERENCE DESIGN	MG	ROB	GD
P08	2023-12-21	REFERENCE DESIGN	MG	FB	ED
P09	2024-10-02	REFERENCE DESIGN	MG	FB	JPH

PROJECT: LUAS FINGLAS

CLIENT: Iompair Éireann Transport Infrastructure Ireland

AUTHORITY: NTA National Transport Authority

CONSULTANT: BARRY TRANSPORTATION; egis

DRAWN:	CONTENT CHECK:	QUALITY CHECK:	APPROVED:	DATE:
M.Galeza	F.Weber	U.Fitzmaurice	J.Phan-Hoang	2024-10-02

SCALES: 1:500

DRAWING STATUS: Suitable for review and comment

PROJECT TITLE: LUAS FINGLAS - PRELIMINARY DESIGN & STATUTORY PROCESS

PROCUREMENT REF: LDD101

CHAINAGE / CORE AREA:

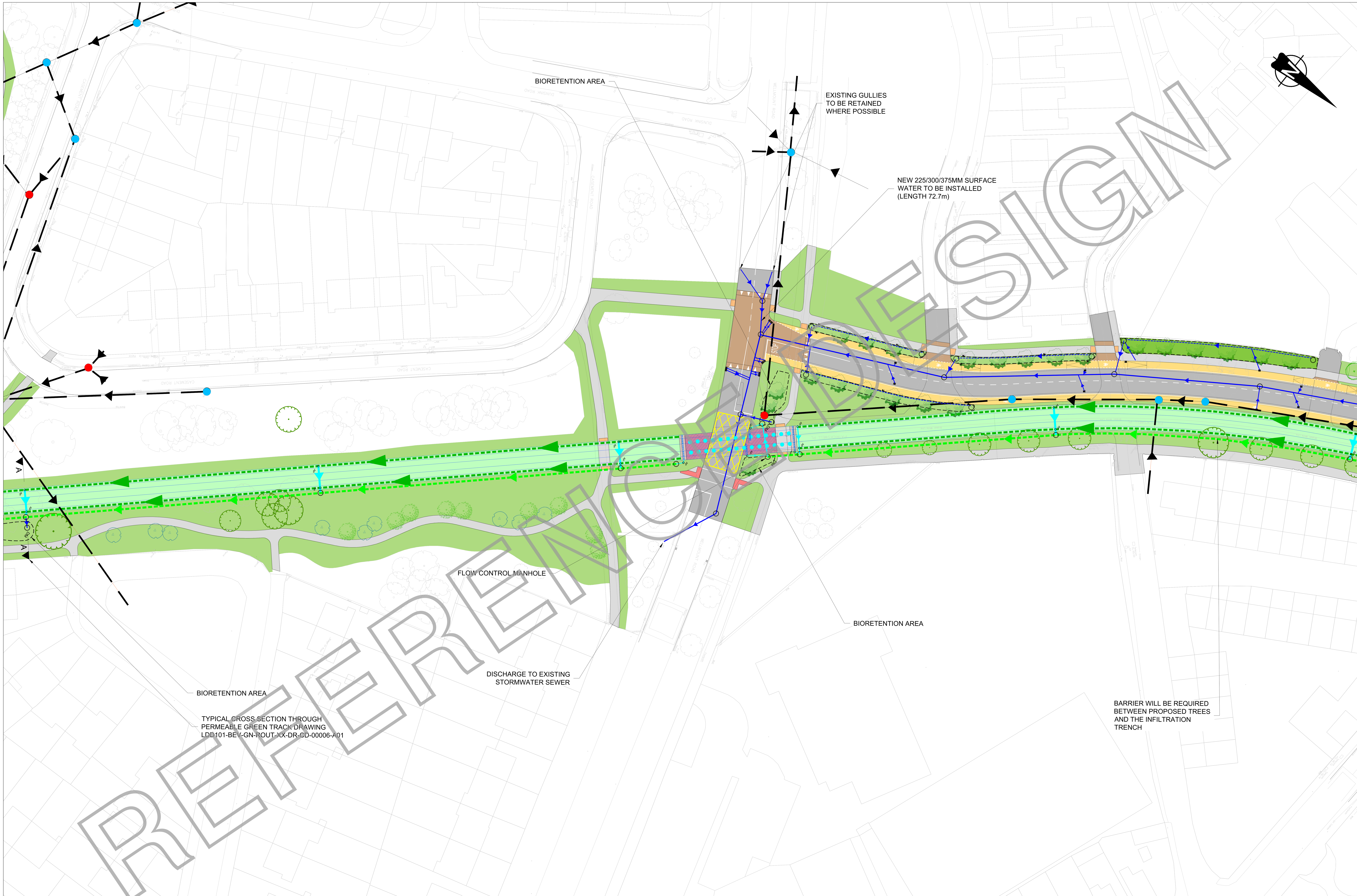
BASE MODEL REF:

DRAWING TITLE: DRAINAGE NETWORK SHEET 5 AREA 32

FILE NAME: LDD101-BEV-RD-GZ32-ZZ-DR-CD-00005

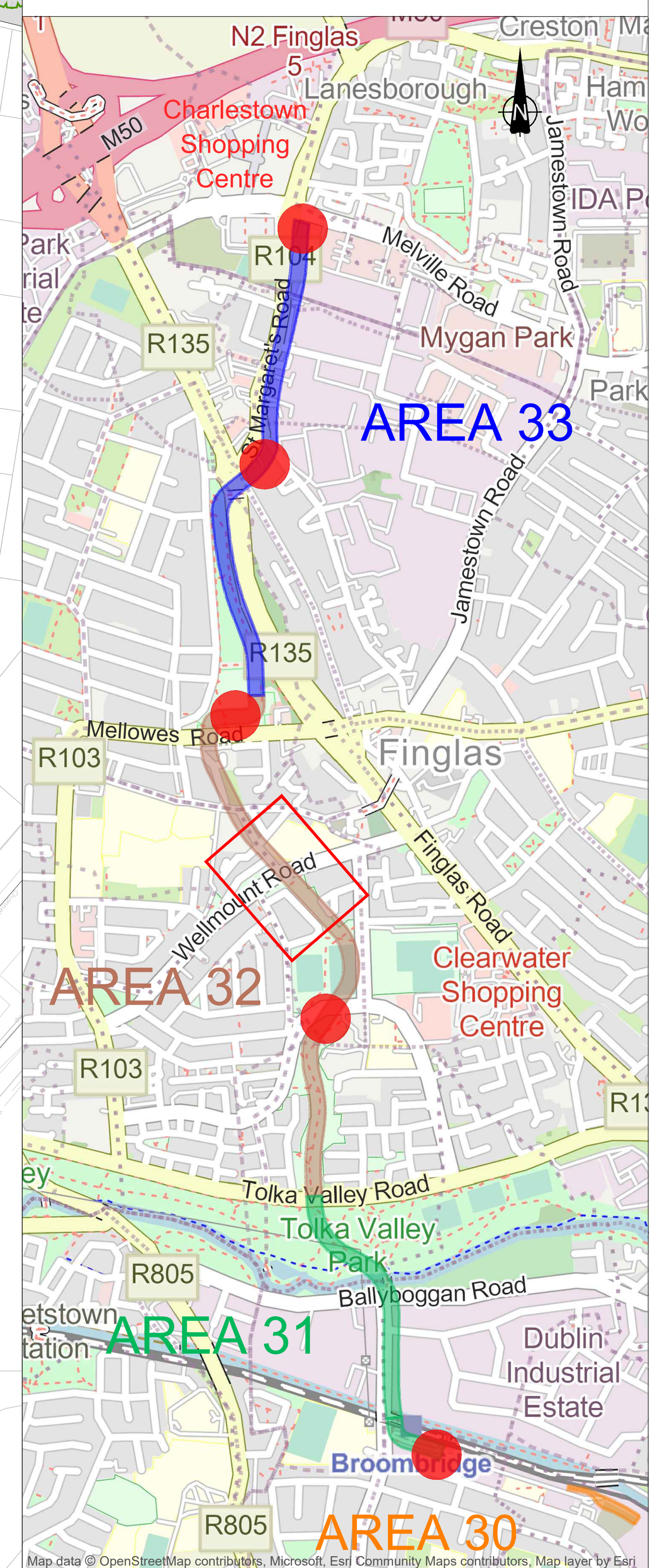
SUITABILITY: S3

REVISION: P09



LEGEND:

- Carrier Drain
- Carrier Drain
- Perforated Drainage Pipe
- Infiltration Trench
- Track Drainage system
- Filter Drain
- ACO Channel (Pedestrian)
- Proprietary slot based track drainage system
- ACO Drain or similiar traverse track drainage system
- Dished Paving
- Existing Surface Water Pipe and Manholes
- Existing Foul Sewer and Manholes
- Lakes, rivers and canals
- ICW Cells
- Cell affected by bridge
- Compensation Storage Area
- ICW
- Access point
- Catchpit Chamber
- Distribution Manhole
- Road Gully
- Side Inlet
- Petrol Interceptor
- ICW Connection Pipes
- Bioretention Area
- Existing tree maintened
- Proposed street tree
- Proposed tree grouping



LOCATIONS OF PROPOSED AND EXISTING DRAINAGE INFRASTRUCTURE ARE INDICATIVE. FINAL LOCATIONS ARE TO BE DETERMINED DURING THE DETAILED DESIGN PHASE

All elevations are in metres and relate to Geoid Model (OSGM02) Malin Head as defined by existing Project Control. All Co-ordinates are in Irish Transverse Mercator Grid (ITM) as defined by VRS active GNSS station Tallaght College (TLLG).

REV	DATE	DESCRIPTION	BY	CHK	APPD
P03	2022-07-06	ISSUED TO TII FOR REVIEW	FB	ROB	ED
P04	2023-03-07	FOR INFORMATION	MG	ROB	ED
P05	2023-06-21	REFERENCE DESIGN	MG	ND	GD
P06	2023-11-08	REFERENCE DESIGN	MG	ROB	GD
P07	2023-12-21	REFERENCE DESIGN	MG	FB	ED
P08	2024-10-02	REFERENCE DESIGN	MG	FB	JPH

PROJECT: LUAS FINGLAS

CLIENT: TII Bonneagar Iompair Éireann Transport Infrastructure Ireland
Ionad Gnó Gheata na Páirce
Sráid Gheata na Páirce
Baile Átha Cliath 8, Éire
Parkgate Business Centre
Parkgate Street
Dublin 8
Ireland, D08 DK10
Phone +353 1 646 3600
www.tii.ie

AUTHORITY: NTA Údarás Náisiúnta Iompair National Transport Authority

CONSULTANT: BARRY TRANSPORTATION egis

DRAWN:	CONTENT CHECK:	QUALITY CHECK:	APPROVED:	DATE:
M.Galeza	F.Weber	U.Fitzmaurice	J.Phan-Hoang	2024-10-02

SCALES: 1:500

DRAWING STATUS: Suitable for review and comment

PROJECT TITLE: LUAS FINGLAS - PRELIMINARY DESIGN & STATUTORY PROCESS

PROCUREMENT REF: LDD101

CHAINAGE / CORE AREA:

BASE MODEL REF:

DRAWING TITLE:
DRAINAGE NETWORK
SHEET 6
AREA 32

FILE NAME: LDD101-BEV-RD-GZ32-ZZ-DR-CD-00006

SUITABILITY: S3

REVISION: P08

NEW 225 TO 300MM SURFACE WATER SEWER TO BE PROVIDED

EXISTING GULLY TO BE RETAINED

GULLIES DISCHARGE TO EXISTING STORMWATER SEWER. EXISTING SEWER WILL REQUIRE RELOCATION

NEW CONNECTION TO EXISTING STORMWATER SEWER ON CARDIFF CASTLE ROAD

BIORETENTION AREA/SUDS FEATURE

NEW GULLIES ON CARDIFF CASTLE ROAD SHALL DISCHARGE TO EXISTING SURFACEWATER INFRASTRUCTURE

BYPASS FUEL/OIL SEPARATOR

BIORETENTION AREA (STORMWATER ATTENUATION)

FLOW CONTROL CHAMBER. OUTFLOW RATE TO BE DETERMINED AT DETAIL DESIGN STAGE

ROAD GULLIES CONNECT TO EXISTING STORMWATER SEWER

EXISTING GULLIES TO BE RETAINED WHERE POSSIBLE

PERVIOUS PAVING PROVIDED TO PARKING BAYS

EXISTING DRAINAGE EAST OF THE KERB LINE TO BE MADE REDUNDANT

DRAINAGE IN EXISTING CAR PARK TO BE PRESERVED AND EXTENSION OF PARKING SURFACE TO BE SLOPED TO EXISTING GULLIES

DISHED CHANNEL IN PAVING PROVIDED TO REAR OF PLATFORM

GULLIES PROVIDED FOR REDUNDANCY

FLOW CONTROL MANHOLE

PERVIOUS PAVING PROVIDED TO PLATFORM

EXISTING STORMWATER SEWER FROM RECORDS

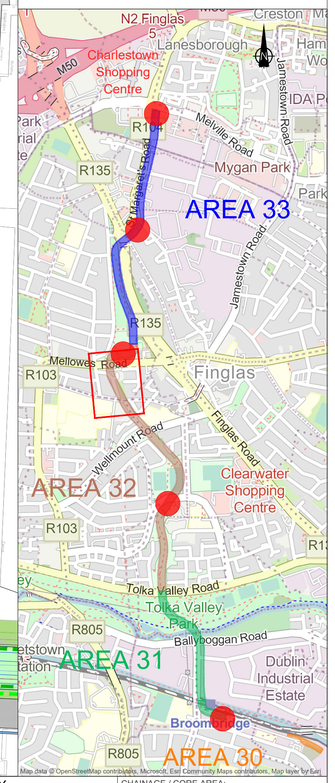
DISCHARGE TO EXISTING STORMWATER SEWER

EXISTING GULLY TO BE RETAINED

LOCATIONS OF PROPOSED AND EXISTING DRAINAGE INFRASTRUCTURE ARE INDICATIVE. FINAL LOCATIONS ARE TO BE DETERMINED DURING THE DETAILED DESIGN PHASE

LEGEND:

- Carrier Drain
- Carrier Drain
- Perforated Drainage Pipe
- Infiltration Trench
- Track Drainage system
- Filter Drain
- ACO Channel (Pedestrian)
- Proprietary slot based track drainage system
- ACO Drain or similiar traverse track drainage system
- Dished Paving
- Existing Surface Water Pipe and Manholes
- Existing Foul Sewer and Manholes
- Lakes, rivers and canals
- ICW Cells
- Cell affected by bridge
- Compensation Storage Area
- ICW
- Access point
- Catchpit Chamber
- Distribution Manhole
- Road Gully
- Side Inlet
- Petrol Interceptor
- ICW Connection Pipes
- Bioretention Area
- Existing tree maintened
- Proposed street tree
- Proposed tree grouping



REV	DATE	DESCRIPTION	BY	CHK	APPD
P03	2022-07-06	ISSUED TO TII FOR REVIEW	FB	ROB	ED
P04	2023-03-07	FOR INFORMATION	MG	ROB	ED
P05	2023-06-21	REFERENCE DESIGN	MG	ND	GD
P06	2023-11-08	REFERENCE DESIGN	MG	ROB	GD
P07	2023-12-21	REFERENCE DESIGN	MG	FB	ED
P08	2024-10-02	REFERENCE DESIGN	MG	FB	JPH

PROJECT: LUAS FINGLAS

CLIENT: Iarnród Éireann Transport Infrastructure Ireland

AUTHORITY: NTA National Transport Authority

CONSULTANT: BARRY TRANSPORTATION; egis

DRAWN:	CONTENT CHECK:	QUALITY CHECK:	APPROVED:	DATE:
M.Galeza	F.Weber	U.Fitzmaurice	J.Phan-Hoang	2024-10-02

SCALES: 1:500

DRAWING STATUS: Suitable for review and comment

PROJECT TITLE: LUAS FINGLAS - PRELIMINARY DESIGN & STATUTORY PROCESS

PROCUREMENT REF: LDD101

CHAINAGE / CORE AREA:

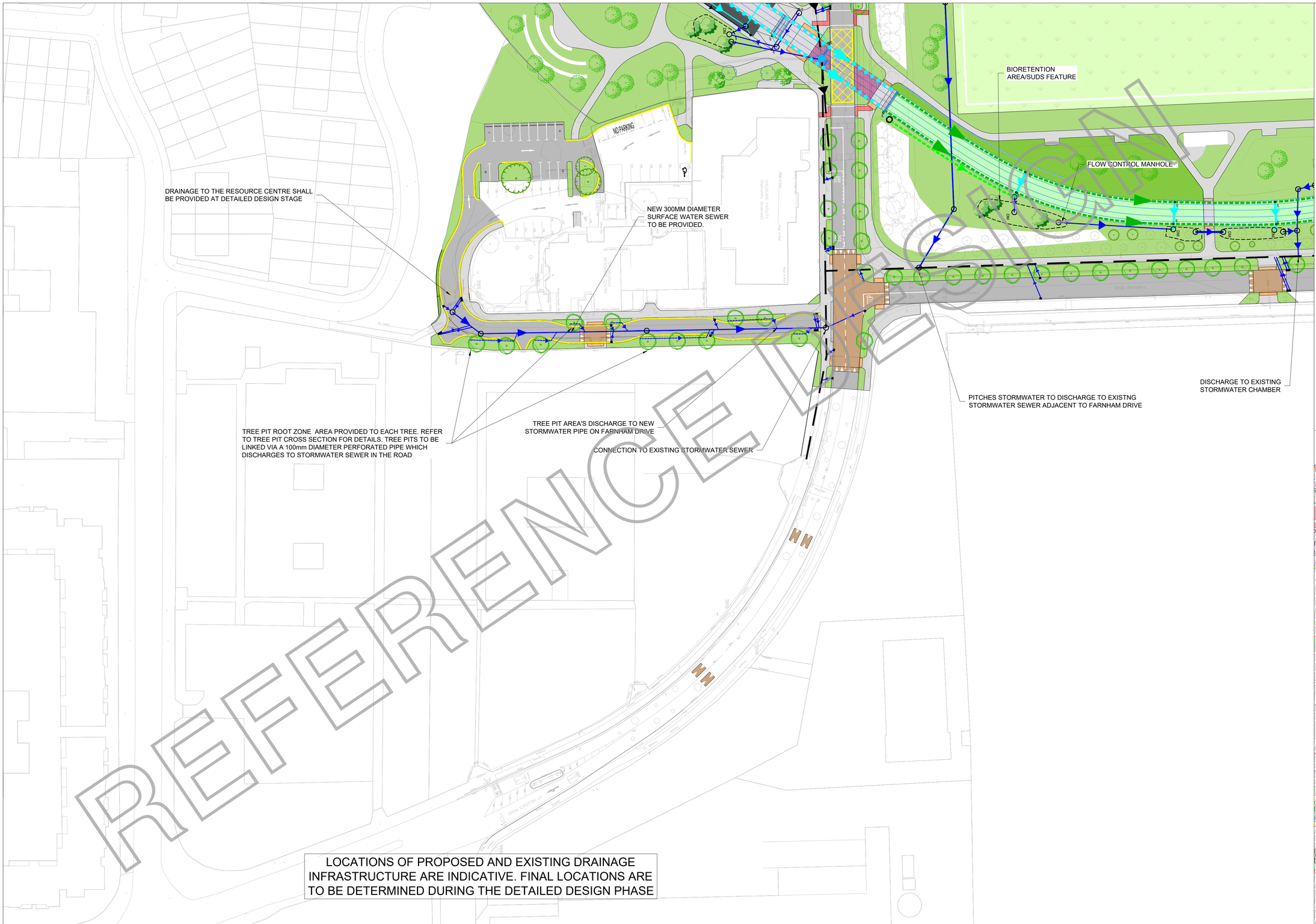
BASE MODEL REF:

DRAWING TITLE: DRAINAGE NETWORK SHEET 7 AREA 32

FILE NAME: LDD101-BEV-RD-GZ32-ZZ-DR-CD-00007

SUITABILITY: S3

REVISION: P08



REFERENCE DESIGN

LOCATIONS OF PROPOSED AND EXISTING DRAINAGE INFRASTRUCTURE ARE INDICATIVE. FINAL LOCATIONS ARE TO BE DETERMINED DURING THE DETAILED DESIGN PHASE

REV	DATE	DESCRIPTION	BY	CHK	APPD
P01	2023-06-21	REFERENCE DESIGN	MG	ND	GD
P02	2023-11-08	REFERENCE DESIGN	MG	ROB	GD
P03	2023-12-21	REFERENCE DESIGN	MG	FB	ED
P04	2024-10-02	REFERENCE DESIGN	MG	FB	JPH

PROJECT: LUAS FINGLAS

CLIENT: Iompair Éireann Transport Infrastructure Ireland

AUTHORITY: NTA Údarás Náisiúnta Iompair National Transport Authority

CONSULTANT: BARRY TRANSPORTATION; egis

DRAWN:	CONTENT CHECK:	QUALITY CHECK:	APPROVED:	DATE:
M.Galeza	F.Weber	U.Fitzmaurice	J.Phan-Hoang	2024-10-02

SCALES: 1:500

DRAWING STATUS: Suitable for review and comment

PROJECT TITLE: LUAS FINGLAS - PRELIMINARY DESIGN & STATUTORY PROCESS

PROCUREMENT REF: LDD101

CHAINAGE / CORE AREA:

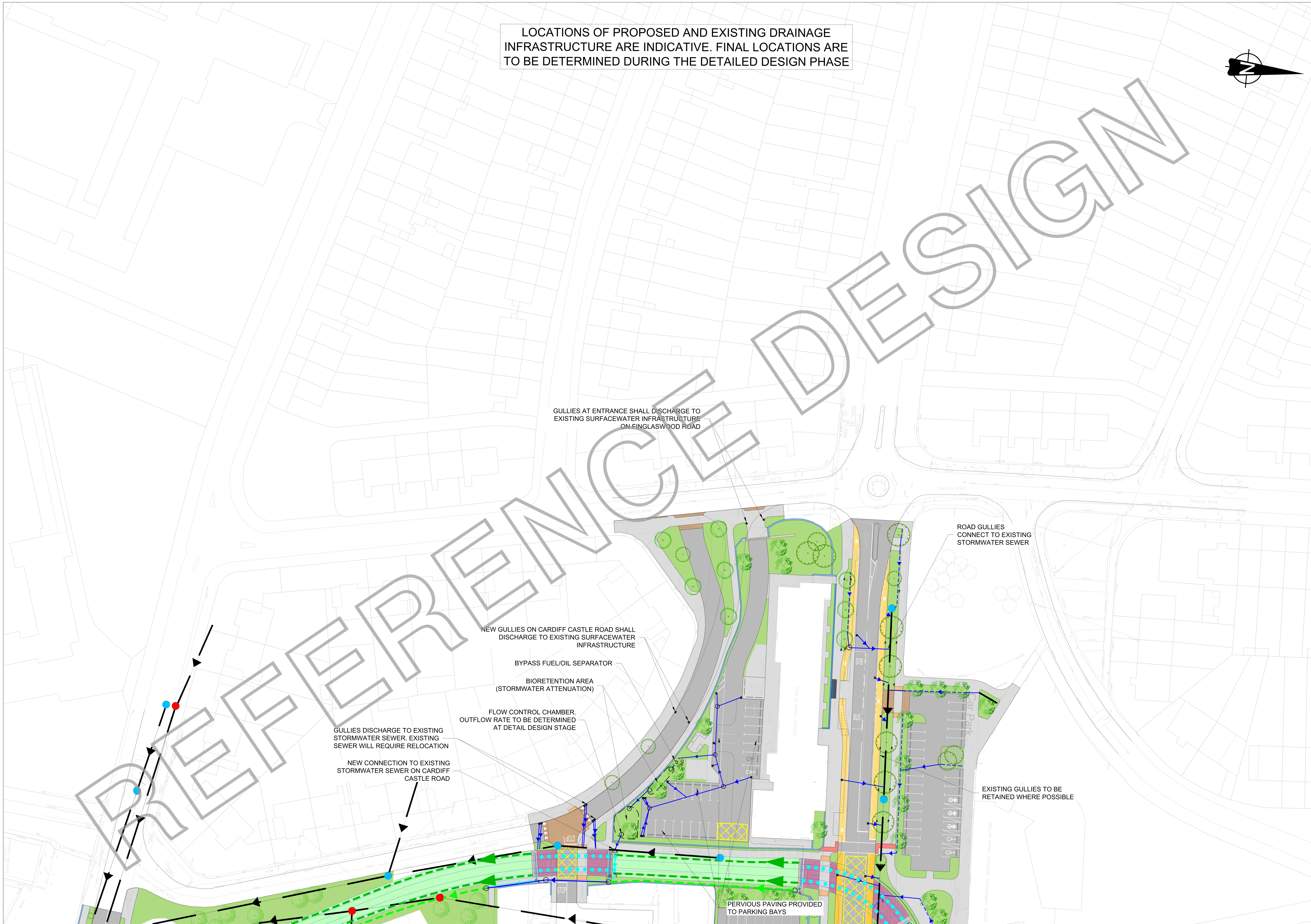
BASE MODEL REF:

DRAWING TITLE: DRAINAGE NETWORK SHEET 14 AREA 32

FILE NAME: LDD101-BEV-RD-GZ32-ZZ-DR-CD-00014

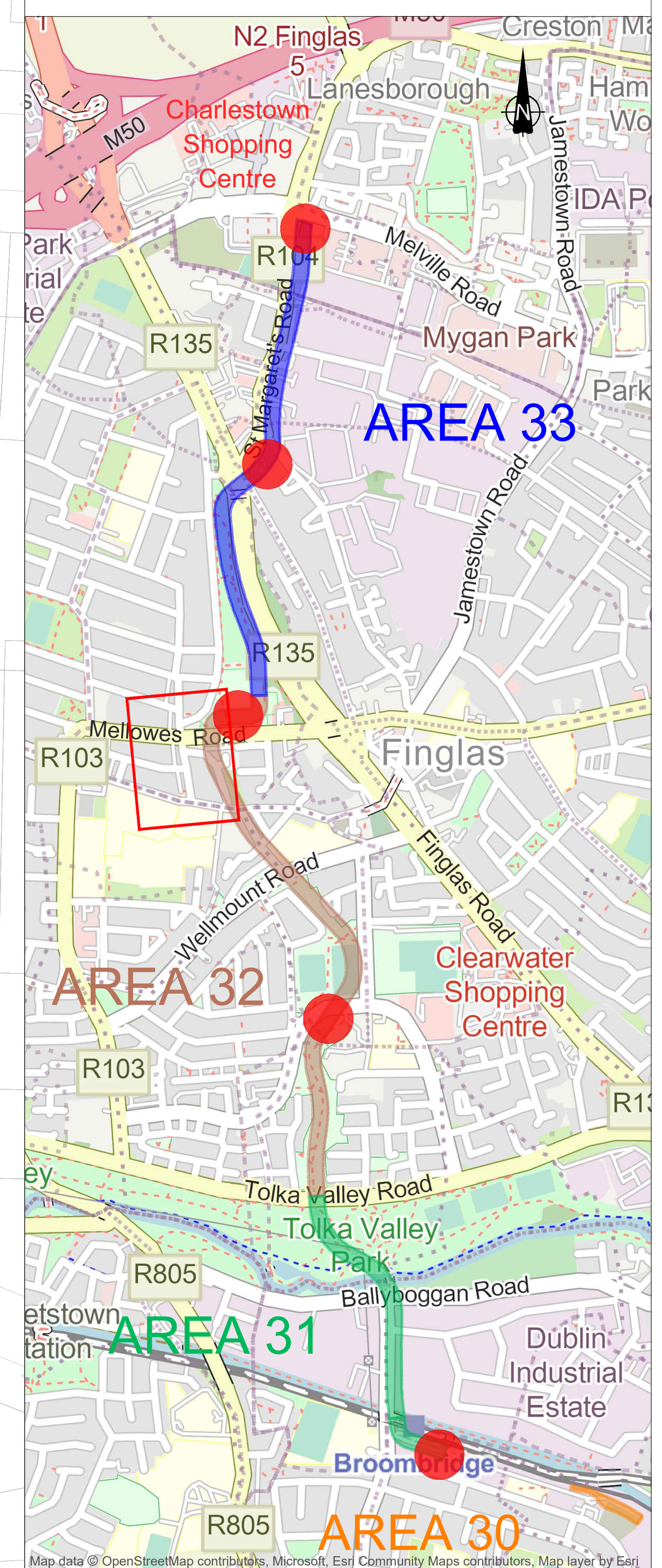
SUITABILITY: S3

REVISION: P04



LEGEND:

- Carrier Drain
- Carrier Drain
- Perforated Drainage Pipe
- Infiltration Trench
- Track Drainage system
- Filter Drain
- ACO Channel (Pedestrian)
- Proprietary slot based track drainage system
- ACO Drain or similiar traverse track drainage system
- Dished Paving
- Existing Surface Water Pipe and Manholes
- Existing Foul Sewer and Manholes
- Lakes, rivers and canals
- ICW Cells
- Cell affected by bridge
- Compensation Storage Area
- ICW
- Access point
- Catchpit Chamber
- Distribution Manhole
- Road Gully
- Side Inlet
- Petrol Interceptor
- ICW Connection Pipes
- Bioretention Area
- Existing tree maintened
- Proposed street tree
- Proposed tree grouping



All elevations are in metres and relate to Geoid Model (OSGM02) Malin Head as defined by existing Project Control. All Co-ordinates are in Irish Transverse Mercator Grid (ITM) as defined by VRS active GNSS station Tallaght College (TLLG).

REV	DATE	DESCRIPTION	BY	CHK	APPD
P01	2024-10-02	REFERENCE DESIGN	MG	FB	JPH

PROJECT: LUAS FINGLAS

CLIENT: Bonneagar Iompair Éireann / Transport Infrastructure Ireland — Ionad Gnó Gheata na Páirce, Sráid Gheata na Páirce, Baile Átha Cliath 8, Éire; Parkgate Business Centre, Parkgate Street, Dublin 8, Ireland, D08 DK10; Phone +353 1 646 3600; www.tii.ie

AUTHORITY: NTA Údarás Náisiúnta Iompair / National Transport Authority

CONSULTANT: BARRY TRANSPORTATION; egis

DRAWN:	CONTENT CHECK:	QUALITY CHECK:	APPROVED:	DATE:
M.Galeza	F.Weber	U.Fitzmaurice	J.Phan-Hoang	2024-10-02

SCALES: 1:500

DRAWING STATUS: Suitable for review and comment

PROJECT TITLE: LUAS FINGLAS - PRELIMINARY DESIGN & STATUTORY PROCESS

PROCUREMENT REF: LDD101

CHAINAGE / CORE AREA:

BASE MODEL REF:

DRAWING TITLE: DRAINAGE NETWORK
SHEET 15
AREA 32

FILE NAME:	SUITABILITY	REVISION
LDD101-BEV-RD-GZ32-ZZ-DR-CD-00015	S3	P01

EXISTING GULLIES TO BE RETAINED WHERE POSSIBLE

PERVIOUS PAVING PROVIDED TO PLATFORM

LOW POINT

BIORETENTION AREA

BIORETENTION AREA

FLOW CONTROL MANHOLE

BIORETENTION AREA

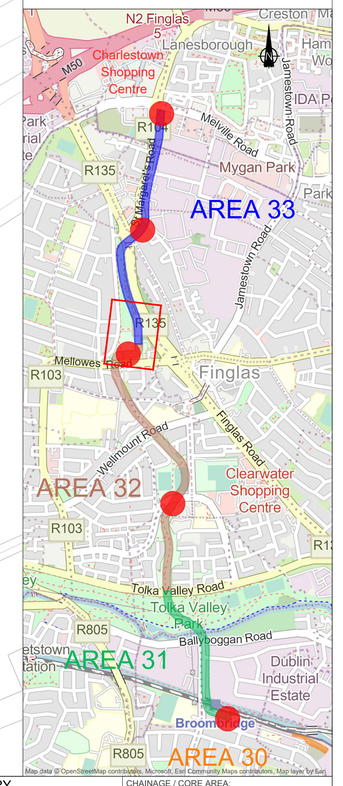
FLOW CONTROL MANHOLE

NEW CONNECTION TO EXISTING STORMWATER SEWER

LOCATIONS OF PROPOSED AND EXISTING DRAINAGE INFRASTRUCTURE ARE INDICATIVE. FINAL LOCATIONS ARE TO BE DETERMINED DURING THE DETAILED DESIGN PHASE

LEGEND:

- Carrier Drain
- Carrier Drain
- Perforated Drainage Pipe
- Infiltration Trench
- Track Drainage system
- Filter Drain
- ACO Channel (Pedestrian)
- Proprietary slot based track drainage system
- ACO Drain or similiar traverse track drainage system
- Dished Paving
- Existing Surface Water Pipe and Manholes
- Existing Foul Sewer and Manholes
- Lakes, rivers and canals
- ICW Cells
- Cell affected by bridge
- Compensation Storage Area
- ICW
- Access point
- Catchpit Chamber
- Distribution Manhole
- Road Gully
- Side Inlet
- Petrol Interceptor
- ICW Connection Pipes
- Bioretention Area
- Existing tree maintened
- Proposed street tree
- Proposed tree grouping



REV	DATE	DESCRIPTION	BY	CHK	APPD
P01	2022-04-05	ISSUED TO TII FOR REVIEW	RF	MG	ED
P02	2022-07-06	ISSUED TO TII FOR REVIEW	FB	ROB	ED
P03	2023-06-21	REFERENCE DESIGN	MG	ND	GD
P04	2023-11-08	REFERENCE DESIGN	MG	ROB	GD
P05	2023-12-21	REFERENCE DESIGN	MG	FB	ED
P06	2024-10-02	REFERENCE DESIGN	MG	FB	JPH

PROJECT: LUAS FINGLAS

CLIENT: Iompair Éireann Transport Infrastructure Ireland

AUTHORITY: NTA National Transport Authority

CONSULTANT: BARRY TRANSPORTATION; egis

DRAWN:	CONTENT CHECK:	QUALITY CHECK:	APPROVED:	DATE:
M.Galeza	F.Weber	U.Fitzmaurice	J.Phan-Hoang	2024-10-02

SCALES: 1:500

DRAWING STATUS: Suitable for review and comment

PROJECT TITLE: LUAS FINGLAS - PRELIMINARY DESIGN & STATUTORY PROCESS

PROCUREMENT REF: LDD101

CHAINAGE / CORE AREA:

BASE MODEL REF:

DRAWING TITLE: DRAINAGE NETWORK SHEET 8 AREA 33

FILE NAME: LDD101-BEV-RD-GZ33-ZZ-DR-CD-00008

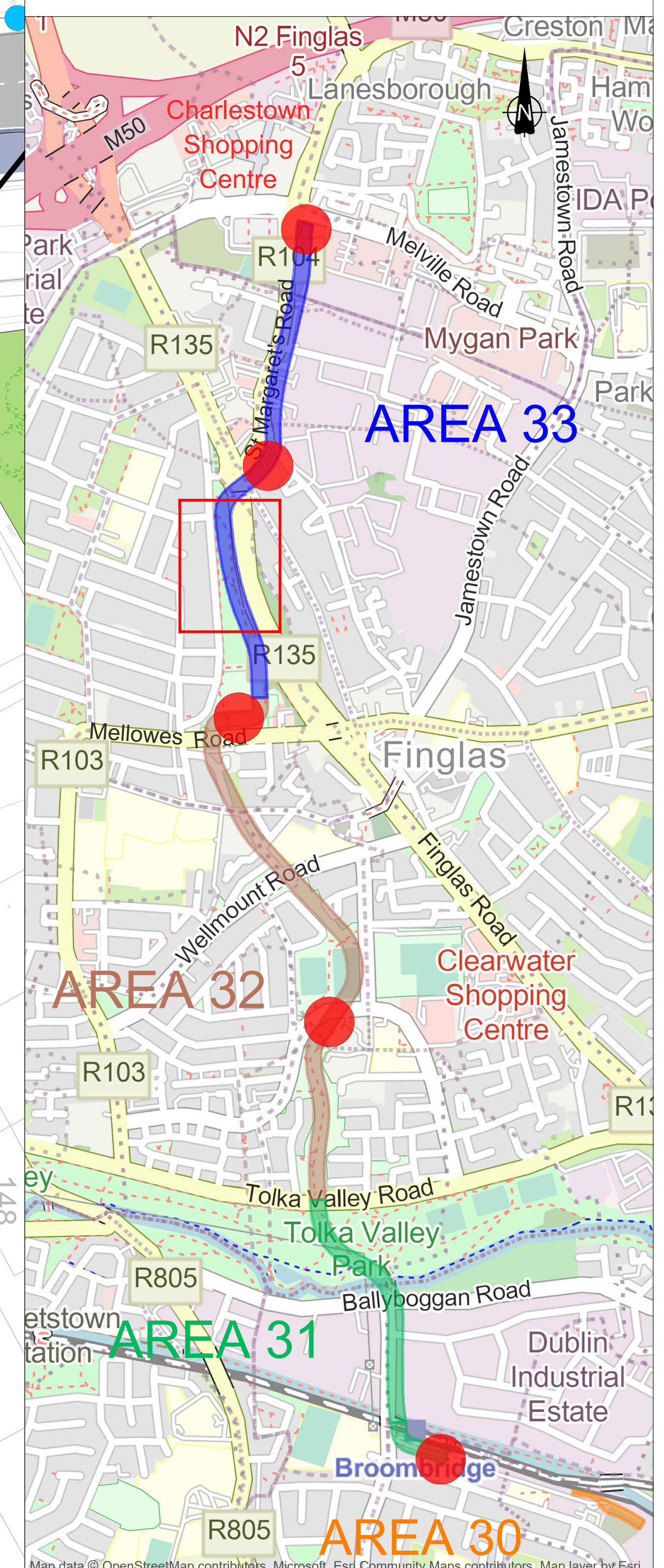
SUITABILITY: S3

REVISION: P06

LOCATIONS OF PROPOSED AND EXISTING DRAINAGE INFRASTRUCTURE ARE INDICATIVE. FINAL LOCATIONS ARE TO BE DETERMINED DURING THE DETAILED DESIGN PHASE

LEGEND:

- Carrier Drain
- Carrier Drain
- Perforated Drainage Pipe
- Infiltration Trench
- Track Drainage system
- Filter Drain
- ACO Channel (Pedestrian)
- Proprietary slot based track drainage system
- ACO Drain or similiar traverse track drainage system
- Dished Paving
- Existing Surface Water Pipe and Manholes
- Existing Foul Sewer and Manholes
- Lakes, rivers and canals
- ICW Cells
- Cell affected by bridge
- Compensation Storage Area
- ICW
- Access point
- Catchpit Chamber
- Distribution Manhole
- Road Gully
- Side Inlet
- Petrol Interceptor
- ICW Connection Pipes
- Bioretention Area
- Existing tree maintened
- Proposed street tree
- Proposed tree grouping



All elevations are in metres and relate to Geoid Model (OSGM02) Malin Head as defined by existing Project Control. All Co-ordinates are in Irish Transverse Mercator Grid (ITM) as defined by VRS active GNSS station Tallaght College (TLLG).

REV	DATE	DESCRIPTION	BY	CHK	APPD
P01	2022-04-05	ISSUED TO TII FOR REVIEW	RF	MG	ED
P02	2022-07-06	ISSUED TO TII FOR REVIEW	FB	ROB	ED
P03	2023-06-21	REFERENCE DESIGN	MG	ND	GD
P04	2023-11-08	REFERENCE DESIGN	MG	ROB	GD
P05	2023-12-21	REFERENCE DESIGN	MG	FB	ED
P06	2024-10-02	REFERENCE DESIGN	MG	FB	JPH

PROJECT: LUAS FINGLAS

CLIENT: TII – Bonneagar Iompair Éireann / Transport Infrastructure Ireland
Ionad Gnó Gheata na Páirce, Sráid Gheata na Páirce, Baile Átha Cliath 8, Éire
Parkgate Business Centre, Parkgate Street, Dublin 8, Ireland, D08 DK10
Phone +353 1 646 3600
www.tii.ie

AUTHORITY: NTA – Údarás Náisiúnta Iompair / National Transport Authority

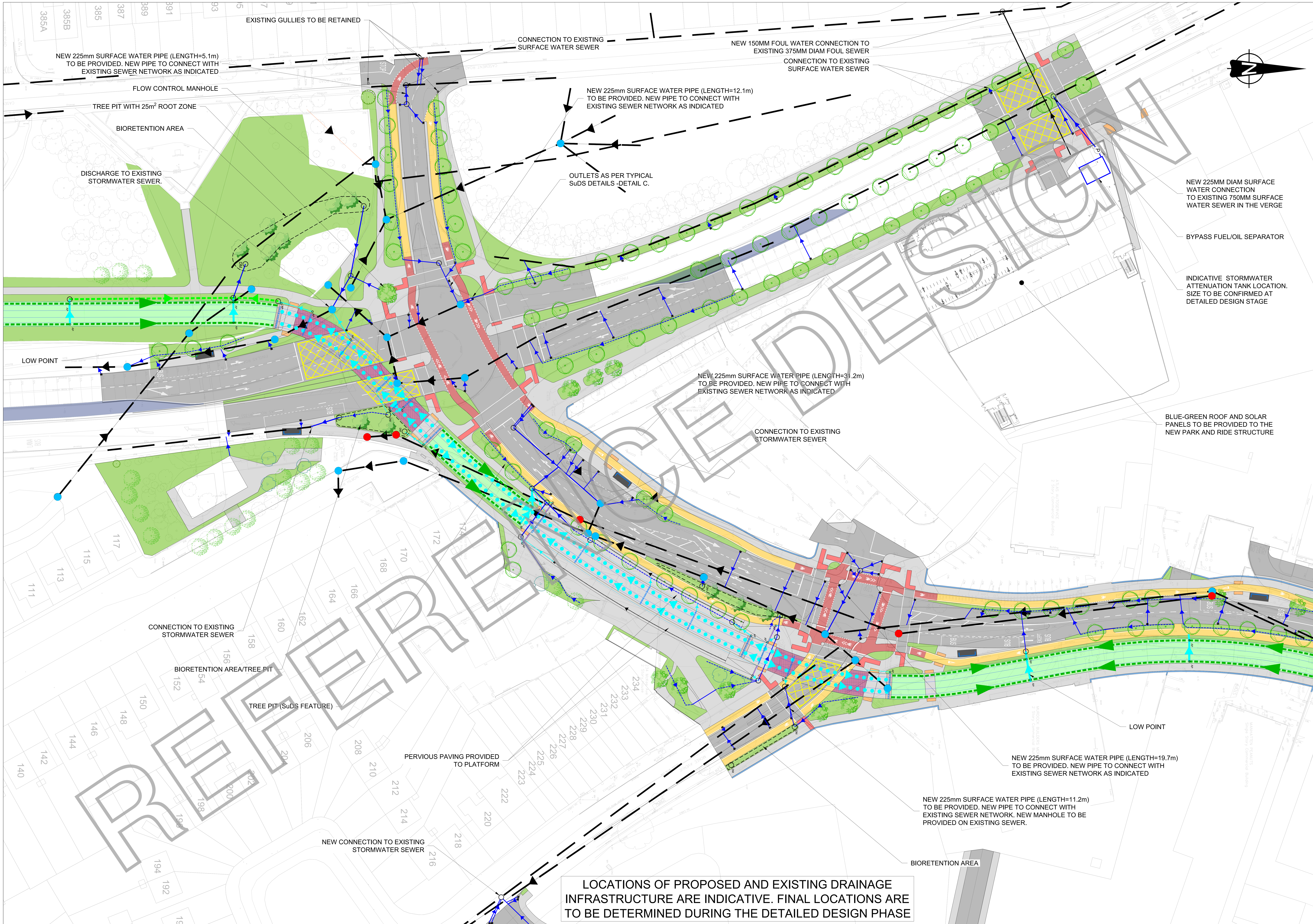
CONSULTANT: BARRY TRANSPORTATION, egis

DRAWN: M.Galeza
CONTENT CHECK: F.Weber
QUALITY CHECK: U.Fitzmaurice
APPROVED: J.Phan-Hoang
DATE: 2024-10-02
SCALES: 1:500
DRAWING STATUS: Suitable for review and comment

PROJECT TITLE: LUAS FINGLAS - PRELIMINARY DESIGN & STATUTORY PROCESS
PROCUREMENT REF: LDD101
CHAINAGE / CORE AREA:
BASE MODEL REF:

DRAWING TITLE: DRAINAGE NETWORK SHEET 9 AREA 33

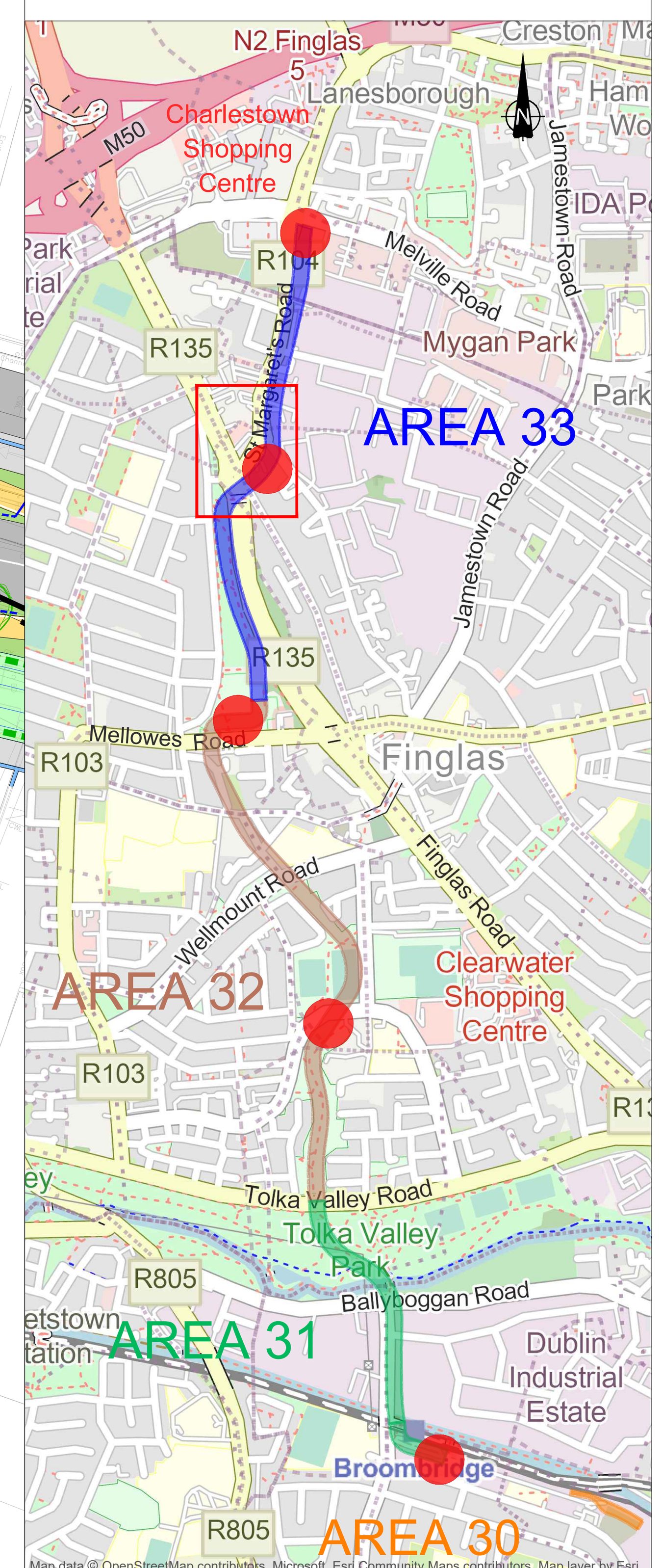
FILE NAME: LDD101-BEV-RD-GZ33-ZZ-DR-CD-00009
SUITABILITY: S3
REVISION: P06



EXISTING GULLIES TO BE RETAINED
CONNECTION TO EXISTING SURFACE WATER SEWER
NEW 150MM FOUL WATER CONNECTION TO EXISTING 375MM DIAM FOUL SEWER
CONNECTION TO EXISTING SURFACE WATER SEWER
NEW 225mm SURFACE WATER PIPE (LENGTH=5.1m) TO BE PROVIDED. NEW PIPE TO CONNECT WITH EXISTING SEWER NETWORK AS INDICATED
FLOW CONTROL MANHOLE
NEW 225mm SURFACE WATER PIPE (LENGTH=12.1m) TO BE PROVIDED. NEW PIPE TO CONNECT WITH EXISTING SEWER NETWORK AS INDICATED
TREE PIT WITH 25m² ROOT ZONE
BIORETENTION AREA
DISCHARGE TO EXISTING STORMWATER SEWER.
OUTLETS AS PER TYPICAL SuDS DETAILS -DETAIL C.
NEW 225MM DIAM SURFACE WATER CONNECTION TO EXISTING 750MM SURFACE WATER SEWER IN THE VERGE
BYPASS FUEL/OIL SEPARATOR
INDICATIVE STORMWATER ATTENUATION TANK LOCATION. SIZE TO BE CONFIRMED AT DETAILED DESIGN STAGE
LOW POINT
NEW 225mm SURFACE WATER PIPE (LENGTH=31.2m) TO BE PROVIDED. NEW PIPE TO CONNECT WITH EXISTING SEWER NETWORK AS INDICATED
CONNECTION TO EXISTING STORMWATER SEWER
BLUE-GREEN ROOF AND SOLAR PANELS TO BE PROVIDED TO THE NEW PARK AND RIDE STRUCTURE
CONNECTION TO EXISTING STORMWATER SEWER
BIORETENTION AREA/TREE PIT
TREE PIT (SuDS FEATURE)
LOW POINT
PERVIOUS PAVING PROVIDED TO PLATFORM
NEW 225mm SURFACE WATER PIPE (LENGTH=19.7m) TO BE PROVIDED. NEW PIPE TO CONNECT WITH EXISTING SEWER NETWORK AS INDICATED
NEW 225mm SURFACE WATER PIPE (LENGTH=11.2m) TO BE PROVIDED. NEW PIPE TO CONNECT WITH EXISTING SEWER NETWORK. NEW MANHOLE TO BE PROVIDED ON EXISTING SEWER.
NEW CONNECTION TO EXISTING STORMWATER SEWER
BIORETENTION AREA
REFERENCE DESIGN

LEGEND:

- Carrier Drain
- Carrier Drain
- Perforated Drainage Pipe
- Infiltration Trench
- Track Drainage system
- Filter Drain
- ACO Channel (Pedestrian)
- Proprietary slot based track drainage system
- ACO Drain or similiar traverse track drainage system
- Dished Paving
- Existing Surface Water Pipe and Manholes
- Existing Foul Sewer and Manholes
- Lakes, rivers and canals
- ICW Cells
- Cell affected by bridge
- Compensation Storage Area
- ICW
- Access point
- Catchpit Chamber
- Distribution Manhole
- Road Gully
- Side Inlet
- Petrol Interceptor
- ICW Connection Pipes
- Bioretention Area
- Existing tree maintened
- Proposed street tree
- Proposed tree grouping



N2 Finglas
Charlestown Shopping Centre
AREA 33
Mygan Park
R135
Mellowes Road
R103
Finglas
Wellmount Road
AREA 32
Clearwater Shopping Centre
Tolka Valley Road
Tolka Valley Park
Ballyboggan Road
R805
AREA 31
Dublin Industrial Estate
Broombridge
AREA 30
Map data © OpenStreetMap contributors, Microsoft, Esri Community Maps contributors, Map layer by Esri

LOCATIONS OF PROPOSED AND EXISTING DRAINAGE INFRASTRUCTURE ARE INDICATIVE. FINAL LOCATIONS ARE TO BE DETERMINED DURING THE DETAILED DESIGN PHASE

All elevations are in metres and relate to Geoid Model (OSGM02) Malin Head as defined by existing Project Control. All Co-ordinates are in Irish Transverse Mercator Grid (ITM) as defined by VRS active GNSS station Tallaght College (TLLG).

REV	DATE	DESCRIPTION	BY	CHK	APPD
P01	2022-04-05	ISSUED TO TII FOR REVIEW	RF	MG	ED
P02	2022-07-06	ISSUED TO TII FOR REVIEW	FB	ROB	ED
P03	2023-06-21	REFERENCE DESIGN	MG	ND	GD
P04	2023-11-08	REFERENCE DESIGN	MG	ROB	GD
P05	2023-12-21	REFERENCE DESIGN	MG	FB	ED
P06	2024-10-02	REFERENCE DESIGN	MG	FB	JPH

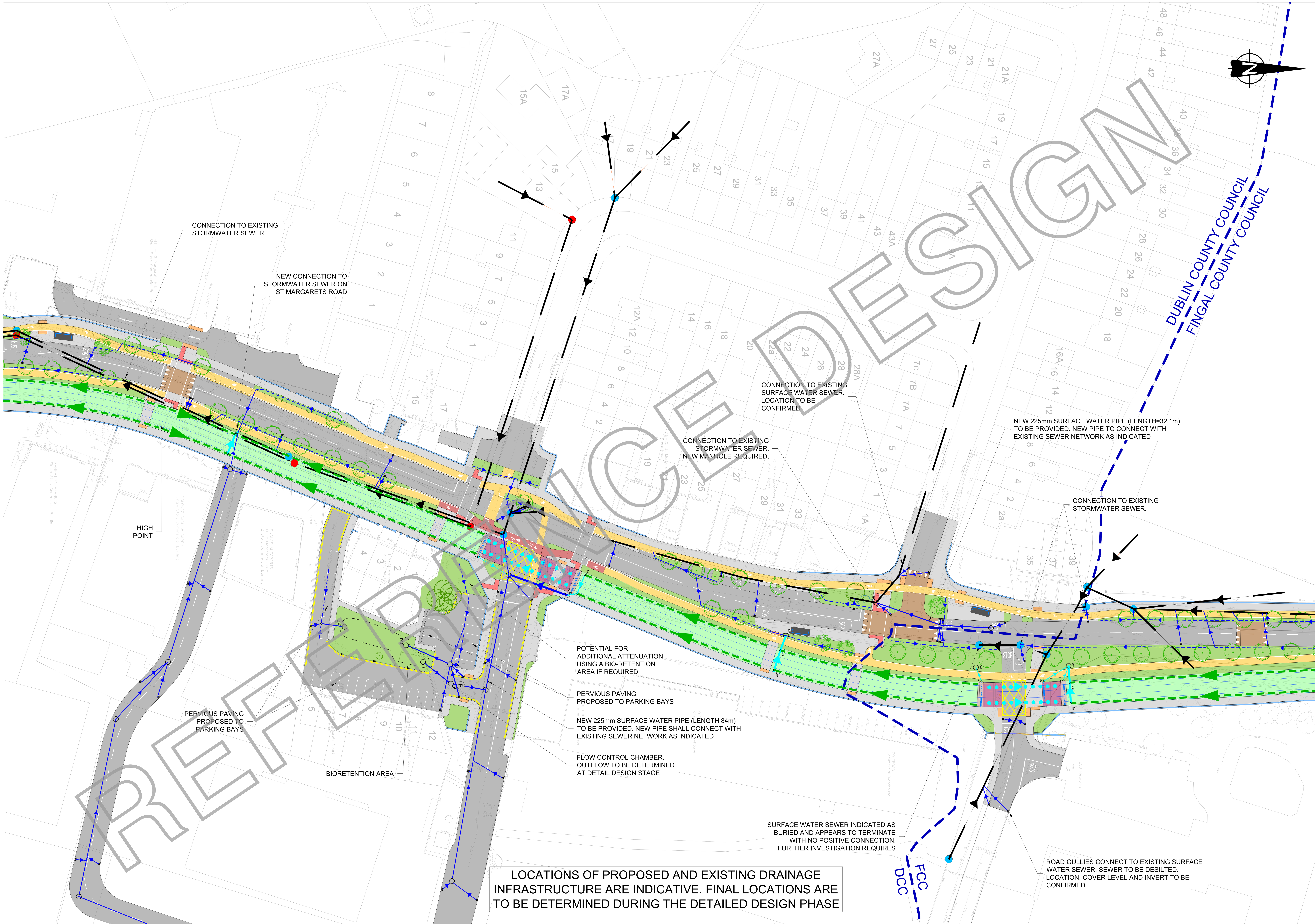
PROJECT: LUAS FINGLAS
CLIENT: TII Bonneagar Iompair Éireann Transport Infrastructure Ireland — Ionad Gnó Gheata na Páirce, Sráid Gheata na Páirce, Baile Átha Cliath 8, Éire; Parkgate Business Centre, Parkgate Street, Dublin 8, Ireland, D08 DK10; Phone +353 1 646 3600; www.tii.ie
AUTHORITY: NTA Údarás Náisiúnta Iompair National Transport Authority
CONSULTANT: BARRY TRANSPORTATION, egis

DRAWN:	CONTENT CHECK:	QUALITY CHECK:	APPROVED:	DATE:
M.Galeza	F.Weber	U.Fitzmaurice	J.Phan-Hoang	2024-10-02

SCALES: 1:500
DRAWING STATUS: Suitable for review and comment

PROJECT TITLE: LUAS FINGLAS - PRELIMINARY DESIGN & STATUTORY PROCESS
PROCUREMENT REF: LDD101
CHAINAGE / CORE AREA:
BASE MODEL REF:
DRAWING TITLE: DRAINAGE NETWORK SHEET 10 AREA 33

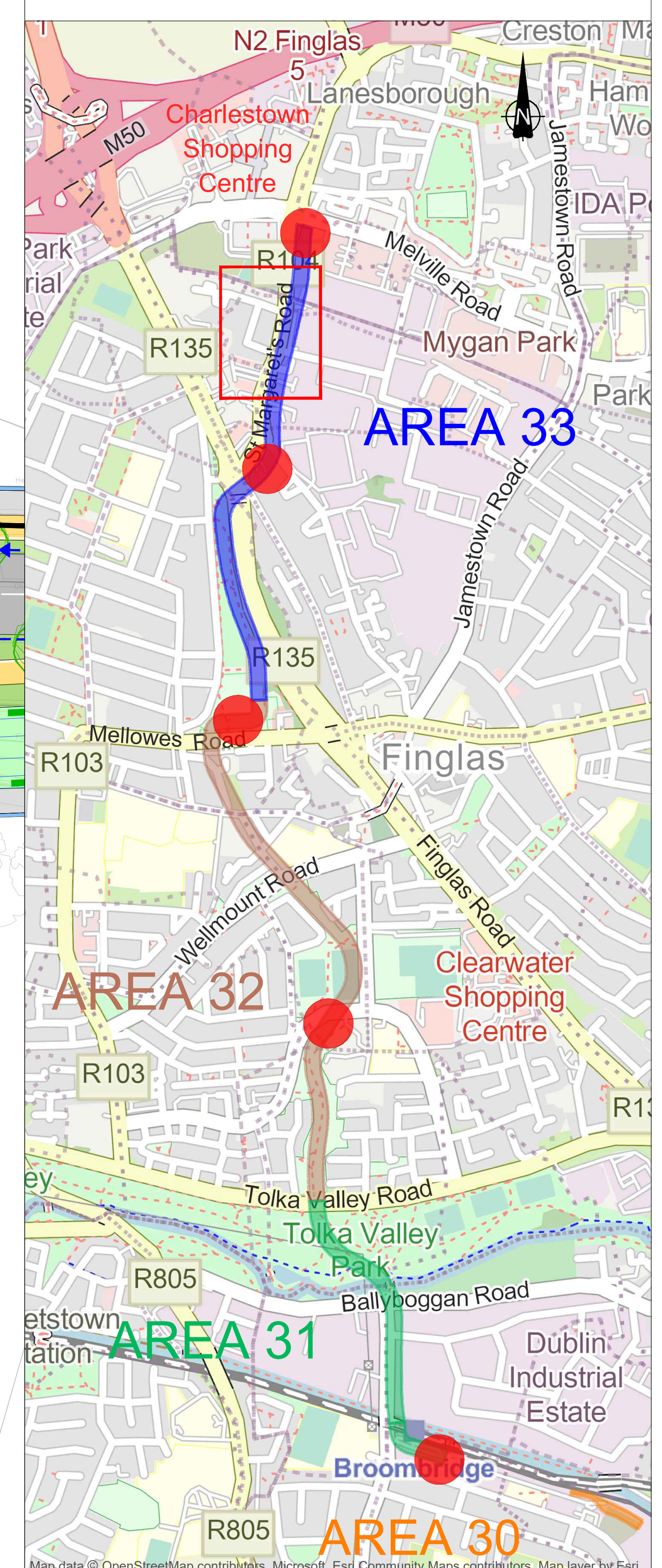
FILE NAME: LDD101-BEV-RD-GZ33-ZZ-DR-CD-00010
SUITABILITY: S3
REVISION: P06



LOCATIONS OF PROPOSED AND EXISTING DRAINAGE INFRASTRUCTURE ARE INDICATIVE. FINAL LOCATIONS ARE TO BE DETERMINED DURING THE DETAILED DESIGN PHASE

LEGEND:

- Carrier Drain
- Carrier Drain
- Perforated Drainage Pipe
- Infiltration Trench
- Track Drainage system
- Filter Drain
- ACO Channel (Pedestrian)
- Proprietary slot based track drainage system
- ACO Drain or similiar traverse track drainage system
- Dished Paving
- Existing Surface Water Pipe and Manholes
- Existing Foul Sewer and Manholes
- Lakes, rivers and canals
- ICW Cells
- Cell affected by bridge
- Compensation Storage Area
- ICW
- Access point
- Catchpit Chamber
- Distribution Manhole
- Road Gully
- Side Inlet
- Petrol Interceptor
- ICW Connection Pipes
- Bioretention Area
- Existing tree maintened
- Proposed street tree
- Proposed tree grouping



The information contained herein has been provided by TII but does not purport to be comprehensive or final. Recipients should not rely on the information. Neither TII nor any of its directors, officers, employees, agents, stakeholders or advisers make any representation or warranty as to, or accept any liability or responsibility in relation to, the adequacy, accuracy, reasonableness or completeness of the information provided as part of this document or any matter on which the information is based (including but not limited to loss or damage arising as a result of reliance by recipients on the information or any part of it). Any liabilities are hereby expressly disclaimed.

All elevations are in metres and relate to Geoid Model (OSGM02) Malin Head as defined by existing Project Control. All Co-ordinates are in Irish Transverse Mercator Grid (ITM) as defined by VRS active GNSS station Tallaght College (TLLG).

REV	DATE	DESCRIPTION	BY	CHK	APPD
P01	2022-04-05	ISSUED TO TII FOR REVIEW	RF	MG	ED
P02	2022-07-06	ISSUED TO TII FOR REVIEW	FB	ROB	ED
P03	2023-06-21	REFERENCE DESIGN	MG	ND	GD
P04	2023-11-08	REFERENCE DESIGN	MG	ROB	GD
P05	2023-12-21	REFERENCE DESIGN	MG	FB	ED
P06	2024-10-02	REFERENCE DESIGN	MG	FB	JPH

PROJECT: LUAS FINGLAS

CLIENT: TII Bonneagar Iompair Éireann / Transport Infrastructure Ireland — Ionad Gnó Gheata na Páirce, Sráid Gheata na Páirce, Baile Átha Cliath 8, Éire. Parkgate Business Centre, Parkgate Street, Dublin 8, Ireland, D08 DK10. Phone +353 1 646 3600, www.tii.ie

AUTHORITY: NTA Údarás Náisiúnta Iompair / National Transport Authority

CONSULTANT: BARRY TRANSPORTATION, egis

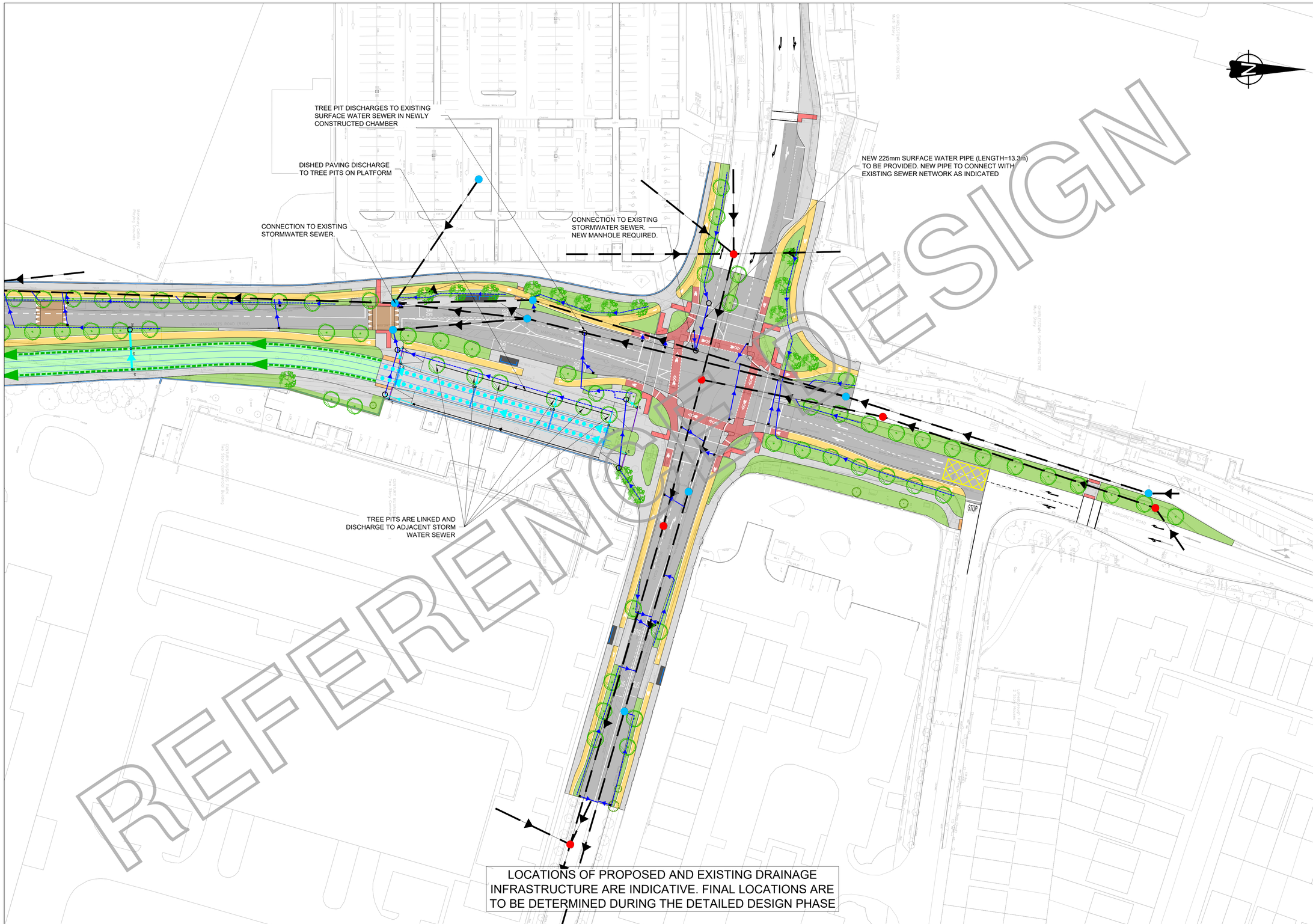
DRAWN:	CONTENT CHECK:	QUALITY CHECK:	APPROVED:	DATE:
M.Galeza	F.Weber	U.Fitzmaurice	J.Phan-Hoang	2024-10-02

SCALES: 1:500
DRAWING STATUS: Suitable for review and comment

PROJECT TITLE: LUAS FINGLAS - PRELIMINARY DESIGN & STATUTORY PROCESS
PROCUREMENT REF: LDD101
CHAINAGE / CORE AREA:
BASE MODEL REF:

DRAWING TITLE: DRAINAGE NETWORK SHEET 11 AREA 33

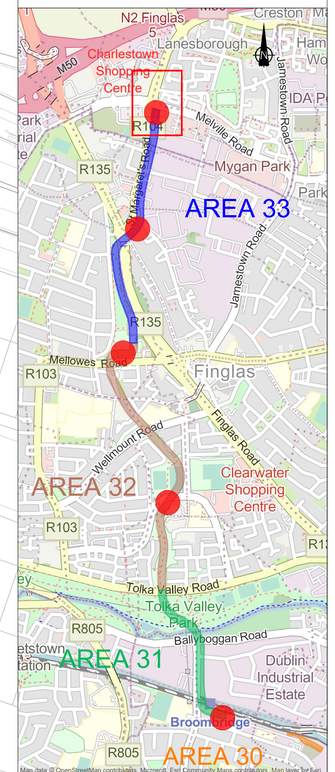
FILE NAME: LDD101-BEV-RD-GZ33-ZZ-DR-CD-00011
SUITABILITY: S3
REVISION: P06



LOCATIONS OF PROPOSED AND EXISTING DRAINAGE INFRASTRUCTURE ARE INDICATIVE. FINAL LOCATIONS ARE TO BE DETERMINED DURING THE DETAILED DESIGN PHASE

LEGEND:

- Carrier Drain
- Carrier Drain
- Perforated Drainage Pipe
- Infiltration Trench
- Track Drainage system
- Filter Drain
- ACO Channel (Pedestrian)
- Proprietary slot based track drainage system
- ACO Drain or similiar traverse track drainage system
- Dished Paving
- Existing Surface Water Pipe and Manholes
- Existing Foul Sewer and Manholes
- Lakes, rivers and canals
- ICW Cells
- Cell affected by bridge
- Compensation Storage Area
- ICW
- Access point
- Catchpit Chamber
- Distribution Manhole
- Road Gully
- Side Inlet
- Petrol Interceptor
- ICW Connection Pipes
- Bioretention Area
- Existing tree maintened
- Proposed street tree
- Proposed tree grouping



REV	DATE	DESCRIPTION	BY	CHK	APPD
P01	2022-04-05	ISSUED TO TII FOR REVIEW	RF	MG	ED
P02	2022-07-06	ISSUED TO TII FOR REVIEW	FB	ROB	ED
P03	2023-06-21	REFERENCE DESIGN	MG	ND	GD
P04	2023-11-08	REFERENCE DESIGN	MG	ROB	GD
P05	2023-12-21	REFERENCE DESIGN	MG	FB	ED
P06	2024-10-02	REFERENCE DESIGN	MG	FB	JPH

PROJECT: LUAS FINGLAS

CLIENT: Iompair Éireann Transport Infrastructure Ireland

AUTHORITY: NTA Údarás Náisiúnta Iompair National Transport Authority

CONSULTANT: BARRY TRANSPORTATION; egis

DRAWN:	CONTENT CHECK:	QUALITY CHECK:	APPROVED:	DATE:
M.Galeza	F.Weber	U.Fitzmaurice	J.Phan-Hoang	2024-10-02

SCALES: 1:500

DRAWING STATUS: Suitable for review and comment

PROJECT TITLE: LUAS FINGLAS - PRELIMINARY DESIGN & STATUTORY PROCESS

PROCUREMENT REF: LDD101

CHAINAGE / CORE AREA:

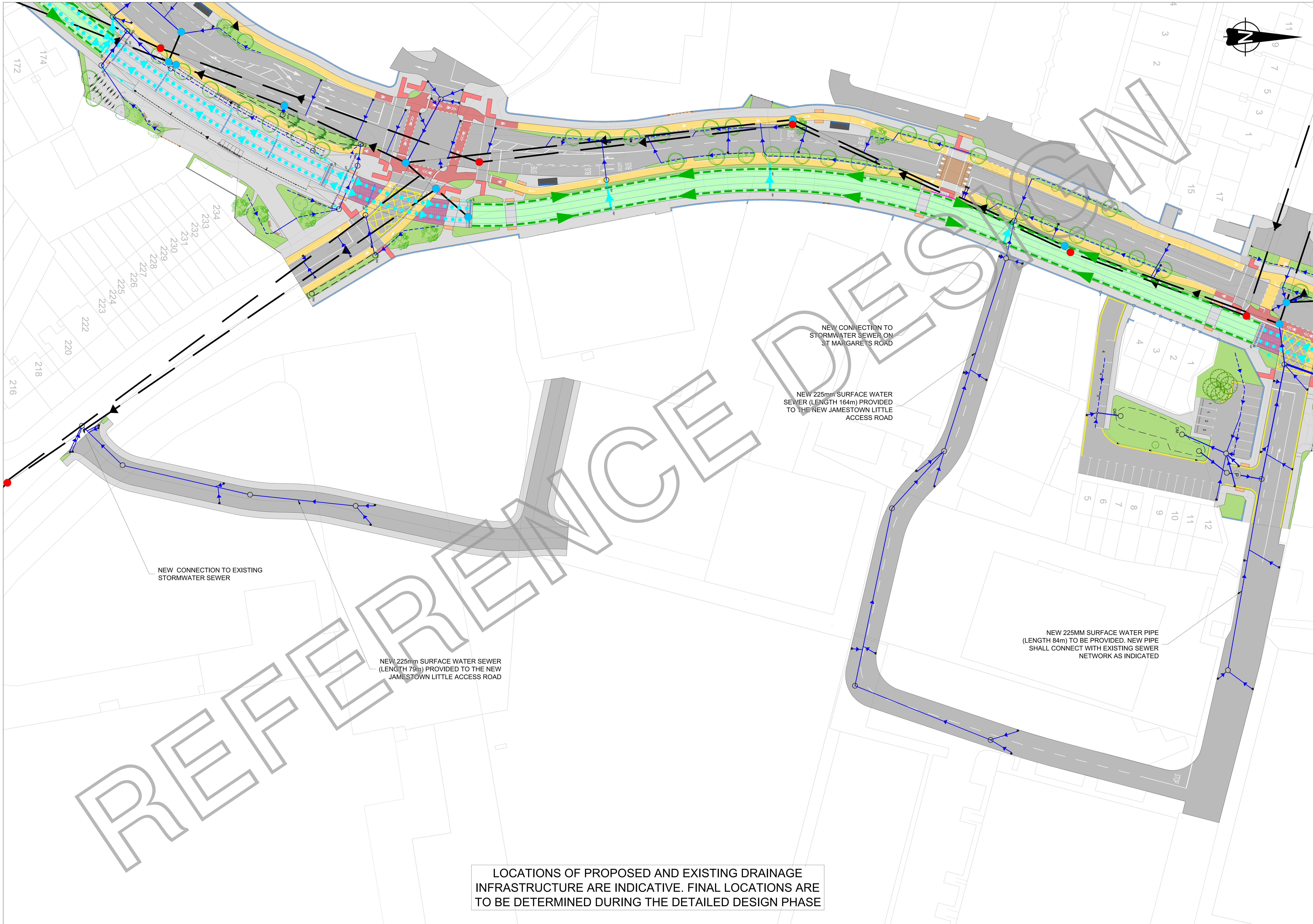
BASE MODEL REF:

DRAWING TITLE: DRAINAGE NETWORK SHEET 12 AREA 33

FILE NAME: LDD101-BEV-RD-GZ33-ZZ-DR-CD-00012

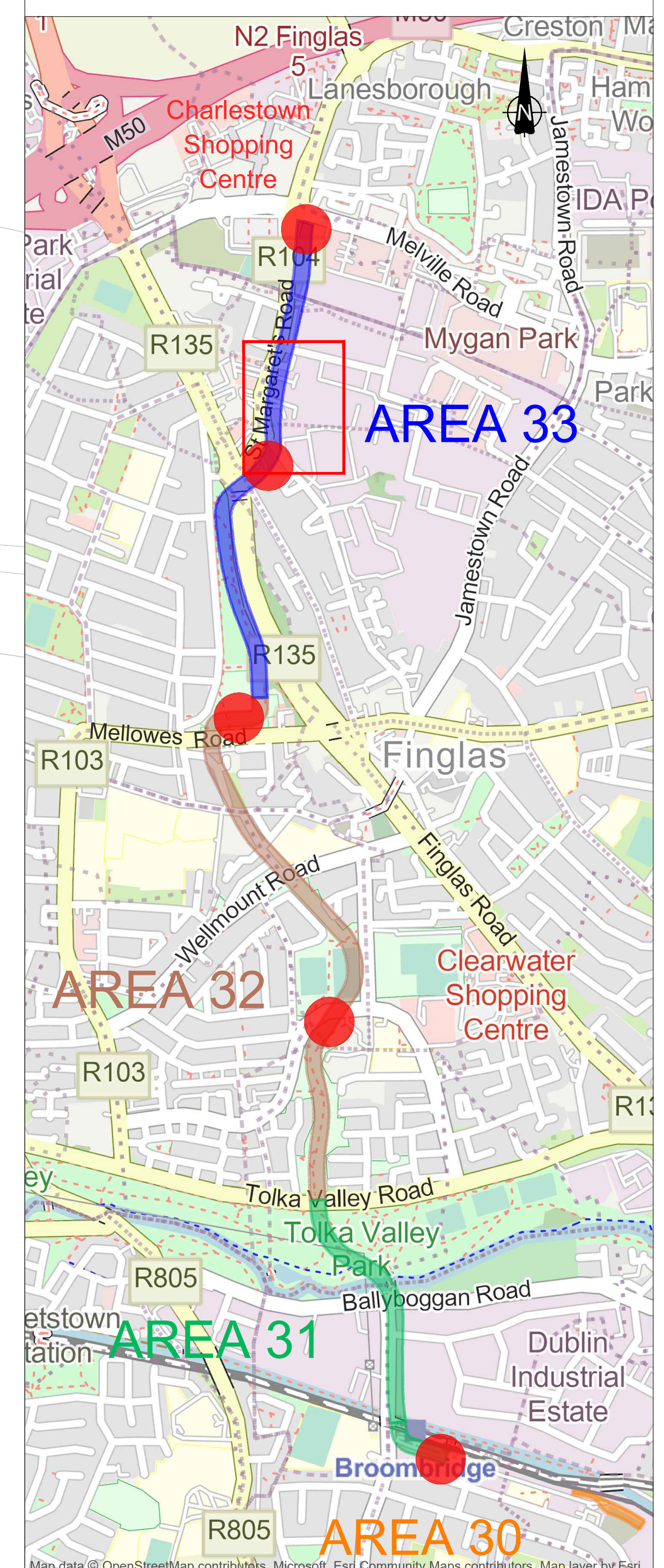
SUITABILITY: S3

REVISION: P06



LEGEND:

- Carrier Drain
- Carrier Drain
- Perforated Drainage Pipe
- Infiltration Trench
- Track Drainage system
- Filter Drain
- ACO Channel (Pedestrian)
- Proprietary slot based track drainage system
- ACO Drain or similiar traverse track drainage system
- Dished Paving
- Existing Surface Water Pipe and Manholes
- Existing Foul Sewer and Manholes
- Lakes, rivers and canals
- ICW Cells
- Cell affected by bridge
- Compensation Storage Area
- ICW
- Access point
- Catchpit Chamber
- Distribution Manhole
- Road Gully
- Side Inlet
- Petrol Interceptor
- ICW Connection Pipes
- Bioretention Area
- Existing tree maintened
- Proposed street tree
- Proposed tree grouping



LOCATIONS OF PROPOSED AND EXISTING DRAINAGE INFRASTRUCTURE ARE INDICATIVE. FINAL LOCATIONS ARE TO BE DETERMINED DURING THE DETAILED DESIGN PHASE

REV	DATE	DESCRIPTION	BY	CHK	APPD
P01	2022-04-05	ISSUED TO TII FOR REVIEW	RF	MG	ED
P02	2022-07-06	ISSUED TO TII FOR REVIEW	FB	ROB	ED
P03	2023-11-08	REFERENCE DESIGN	MG	ROB	GD
P04	2023-12-21	REFERENCE DESIGN	MG	FB	ED
P05	2024-10-02	REFERENCE DESIGN	MG	FB	JPH

PROJECT: LUAS FINGLAS
CLIENT: TII
AUTHORITY: NTA
CONSULTANT: BARRY TRANSPORTATION; egis

DRAWN:	CONTENT CHECK:	QUALITY CHECK:	APPROVED:	DATE:
M.Galeza	F.Weber	U.Fitzmaurice	J.Phan-Hoang	2024-10-02

SCALES: 1:500
DRAWING STATUS: Suitable for review and comment

PROJECT TITLE: LUAS FINGLAS - PRELIMINARY DESIGN & STATUTORY PROCESS
PROCUREMENT REF: LDD101
CHAINAGE / CORE AREA:
BASE MODEL REF:
DRAWING TITLE: DRAINAGE NETWORK SHEET 13 AREA 33

FILE NAME:	SUITABILITY	REVISION
LDD101-BEV-RD-GZ33-ZZ-DR-CD-00013	S3	P05

Bonneagar Iompair Éireann
Transport Infrastructure Ireland

Údarás Náisiúnta Iompair
National Transport Authority

BARRY TRANSPORTATION
egis GROUP

egis

Project Ireland 2040
Building Ireland's Future