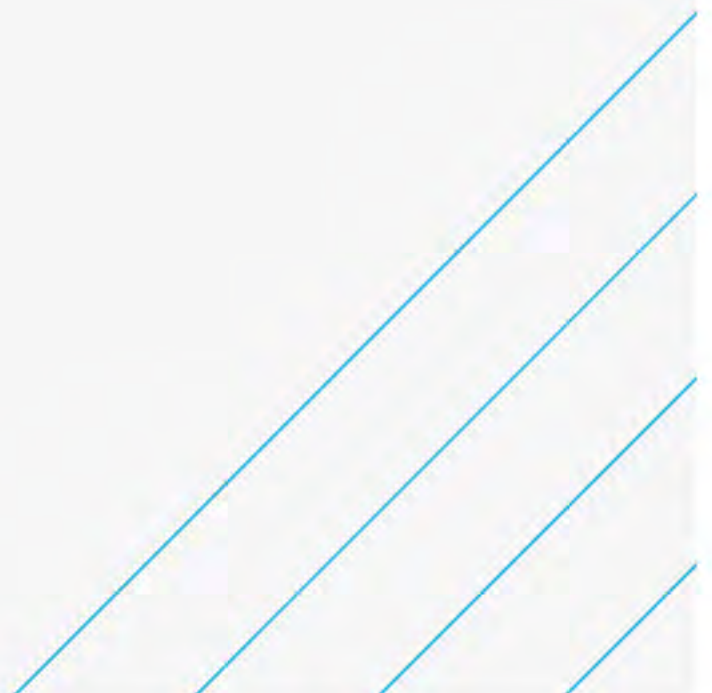


Edinburgh Tram

Vibration and Ground-borne Noise Review

City of Edinburgh Council

11th March 2021



Notice

This document and its contents have been prepared and are intended solely as information for City of Edinburgh Council and use in relation to the noise and vibration that is expected to arise from completion of Phase 1a of the Edinburgh Trams system from York Place to Newhaven.

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This document has 24 pages including the cover (not including appendices).

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Executive Summary

This document sets out the scheme requirements for Edinburgh Trams York Place to Newhaven (ETYN) in relation to Noise & Vibration (N&V) and the Contractor proposals to achieve satisfactory compliance.

The Contractor, Sacyr Farrans Neopul (SFN), is responsible for the design and construction of these works and hence for ensuring that the works comply with the requirements set out in the Infrastructure and Systems Contract.

Atkins is acting as client technical advisor on behalf of the City of Edinburgh Council.

The Contractor for the vibration study is the SFN consortium, although the lead vibration consultant is employed by the Sener group.

This review considers the Contractor's final design submission including the "Positive Impact of Elastic Track Solutions as Effective Counter-measures against Ground-borne Noise Generated by Edinburgh Trams" Addendum.

1. Introduction

The Edinburgh Trams York Place to Newhaven (ETYN) project extents include 4.6km of twin track taking the existing route from York Place, in the city, to Newhaven.

ETYN has to comply with the Edinburgh Tram Act Lines One and Two - Noise and Vibration Policy of March 2006. This Policy statement sets out the approach to be adopted in mitigating noise from the operation of Edinburgh Tram. The Contractor is responsible for demonstrating that their design will meet the requirements set out in the Contract.

It should be noted that compliance with the Code of Construction Practice is required to control construction activities.

To date, the Contractor has produced trackwork reports ETYN-SEF-XXX-12-RP-H-0010, covering the Ocean Terminal to Newhaven section of the route, and ETYN-SEF-XXX-12-RP-H-0012, covering the York Place to Ocean Terminal section. Both reports include Appendix 2 "Vibration" which outlines the Contractor's approach to addressing the project Noise & Vibration requirements. The Contractor's design has been reviewed, and through design challenge and queries raised, the Contractor has presented a robust response and solution meeting the scheme requirements. Atkins are satisfied with the approach taken.

The issue of ground-borne noise has been raised and Atkins found that, notwithstanding the lack of a specific ground-borne noise criterion, the Contractor had in fact sought to control ground-noise within residential properties to no more than 40 dB(A) and had applied appropriate criteria for other types of sensitive buildings.

The Noise and Vibration Policy that applies to the scheme specifies no limit although it is understood that an informal ground-borne noise limit of 40 dB(A) for residential properties was applied to the existing Edinburgh tramway. This is the same value that is given in Table 1.1.1 in paragraph 1.1.2 of the report "Edinburgh Tram Network - Newhaven Road to Haymarket - Ground borne noise and vibration study" prepared by D2S International (dated 4 August 2009) for the existing section of the tramway. The report states that the criteria are based on "Rupert Taylor report "Noise and Vibration Stage 2 Report Sensitive Receptor Study" dated 19th March 2007".

The criteria adopted by D2S are shown in the extract below:

Building	Level/Metric [dB L _{Amax}]
Residential buildings	40
Offices	40
Hotels	40
Theatres	25
Large Auditoria/Concert Halls	25
Studios	30
Churches	35
Courts, lecture theatres	35
Small Auditoria/halls	35
Schools Colleges	40
Hospitals, laboratories	40
Libraries	40

It should be noted that UKTram Ltd states in Section 5.3 of its document Best Practice Guidance Design and Specification for Minimum Noise and Vibration Impact, issued on 30 July 2007, that:

“Although it is not always possible to measure ground-borne noise in the presence of airborne sound either from the tram or from general ambient background noise, unless specialised techniques are applied, it is recommended that the system shall be specified not to generate ground-borne noise within neighbouring properties, where it is measurable, greater than 40 dB(A) on a meter with “Slow” response for any individual tram pass-by event.”

Through review, Atkins found that the Contractor had followed a standard method of assessing vibration (US Federal Transit Administration’s “Transit Noise and Vibration Impact Assessment Manual” of September 2018) and had proposed different types of track at various locations to mitigate the effects of vibration.

The supplier of trackwork solutions for vibration mitigation is Pandrol. Pandrol is a very well-established company in the field of track components and will be able to supply the vibration attenuation measures that the Contractor has specified. The Contractor’s trackwork design utilises various Pandrol products to apply a standard, soft and floating track solution to address where mitigation measures are required. In general terms, a standard track solution is applied where no additional mitigation is required, soft track where moderate and floating where a more significant solution is required.

The Pandrol offering, specifically their Q track system, is one which has been utilised the world over, including recently on the extension to the tram system in Blackpool. Appendix 5 includes the Pandrol Q Track embedded Rail datasheet.

2. Legal and Scheme Requirements

This section provides legal and scheme requirements in relation to vibration and ground-borne noise only. Airborne noise is not considered in this document.

2.1. Edinburgh Tram Lines One & Two – Noise and Vibration Policy

The Noise & Vibration Policy states that trackforms adjacent to sensitive receptor buildings will be designed using best practicable means to keep within the guideline levels of Vibration Dose Value (VDV) given in BS6472, 1992 (Guide to evaluation of human exposure to vibration in buildings. Vibration sources other than blasting) below which the probability of adverse comments is low:

- Day (0700-2300 hours) 0.2 m/s^{1.75}; and
- Night (2300-0700 hours) 0.13 m/s^{1.75}.

In addition, the Noise & Vibration Policy includes that the design of the tramway will include a Peak Particle Velocity (PPV) level no higher than 2mm/s at 2m from the rails.

The vibration peak particle velocity (PPV) should be compared with the recommendations given in British Standard BS 7385-2:1993 Evaluation and measurement for vibration in buildings — Part 2: Guide to damage levels from groundborne vibration which in section 7.4.1 states that:

“Some data suggests that the probability of damage tends towards zero at 12.5 mm/s peak component particle velocity.”

Examination of the scheme drawings has shown that no residence is closer to the rails than 2m. Accordingly, the 2mm/s at 2m from the rails level specified in the Vibration Policy is considered to be conservative.

It should be noted that the Contractor is following BS 6472-1 2008 as the current version of this standard.

The following table shows the VDV limits that are specified in BS6472:1992.

Table 7 — Vibration dose values (m/s^{1.75}) above which various degrees of adverse comment may be expected in residential buildings

Place	Low probability of adverse comment	Adverse comment possible	Adverse comment probable
Residential buildings 16 h day	0.2 to 0.4	0.4 to 0.8	0.8 to 1.6
Residential buildings 8 h night	0.13	0.26	0.51

The limits specified in BS6472-1 2008 are given in the following table:

Table 1 Vibration dose value ranges which might result in various probabilities of adverse comment within residential buildings

Place and time	Low probability of adverse comment $\text{m}\cdot\text{s}^{-1.75}$ 1)	Adverse comment possible $\text{m}\cdot\text{s}^{-1.75}$	Adverse comment probable $\text{m}\cdot\text{s}^{-1.75}$ 2)
Residential buildings 16 h day	0.2 to 0.4	0.4 to 0.8	0.8 to 1.6
Residential buildings 8 h night	0.1 to 0.2	0.2 to 0.4	0.4 to 0.8

With regard to the Edinburgh scheme, it may be seen from the above BS6472 extract that the Edinburgh Tram Vibration Policy daytime VDV guideline level of $0.2 \text{ m/s}^{1.75}$ corresponds with the lower daytime value for “Low probability of adverse comment” given above.

In instances where the VDV limit would otherwise be exceeded, the Contractor has adopted a specific trackform designed to reduce the impact of tram operations by attenuating vibration at source. The Contractor's application of attenuation and the prediction calculations are considered to satisfy the above requirements.

2.2. Ground Borne Noise

As is commonly the case for tramways, the Noise & Vibration Policy does not state limits for ground borne noise (GBN). The lack of a specific GBN criterion is not judged to be a problem in a scheme such as this, where there are no tunnels, as the airborne noise contribution would typically dominate the ground-borne noise.

Notwithstanding the above, Ground Borne Noise is not being ignored by the project with specific reference being included within the Edinburgh Tram Design Manual which states the following:

Noise

5.101

- *The construction of the trackslab must be designed to reduce ground- borne vibration or noise, particularly to adjacent properties.*
- *An acceptable balance must be reached between technical requirements for noise reduction and aesthetic requirements within sensitive areas of townscape, particularly in the WHS and conservation areas.*

The criteria specified for comparable project specifications are included in Appendix 1. The Policy's PPV vibration criterion and the noise criteria are all consistent with the relevant Standards and generally similar to the criteria specified for other tramway and railway projects.

The Contractor has confirmed that they are considering ground-borne noise within their design. This may be seen from inspection of the addendum which gives predicted ground-borne noise levels for the various properties, none of which, when rounded to the nearest decibel, exceeds 40 dB(A) at a residence.

Appendix 3, trackwork layouts, highlights the trackwork solution applied along the route. This includes correlation to the sensitive buildings noted in Appendix 4.

Appendix 4 includes the levels post analysis and mitigation measures included.

3. Review of Predictions

The Contractor has provided the output of their vibration analysis which supports the overall trackworks design. The Contractor has demonstrated that they have followed established process utilising acceptable limits.

3.1. Analysis Method

The Contractor has adopted a well-established Detailed Vibration Analysis method laid down in the US Federal Transit Administration (FTA) document Transit Noise and Vibration Impact Assessment Manual. The FTA document states that:

“The Detailed Vibration Analysis procedure is a comprehensive assessment method that produces the most accurate estimates of vibration impact for a proposed project and is often accomplished during the engineering phase of a project when there are sufficient data identifying potential adverse vibration impacts from the project.”

As applied to the project, the procedure was essentially as follows:

- The vibration acceleration of a tram passing by on the existing tram track was measured for both ordinary track and for the case of a turnout (i.e. a set of points). This gave a source value for the vibration.
- At sample locations along the route of the proposed extension, a vibration source (a compactor) was used to induce vibration in the ground. At various distances from this vibration source, measurements were taken of the vibration acceleration to establish what attenuation occurred over distance.
- To obtain data on the transfer of vibration energy within the different parts of a property structure, the Contractor took measurements at various locations within 129 Leith Walk of vibration acceleration arising from an external source. It is understood that this property was chosen due to previous complaints raised from the residents and concerns that the trams passing by their property would give rise to high levels of vibration within it. The FTA method gives values for different types of building structure/foundations etc. The Contractor has applied a more sensible value based on the assessment of worst-case Edinburgh data rather than recommendations from the guidance.

The Contractors utilisation of this property, 129 Leith Walk, as a baseline is reasonable and can be seen as a worst-case example to support route wide analysis. Having regard to the fact that indicative values are available for internal noise transmission (e.g. such sources as the Association of Noise Consultants’ “Red Book”) and the general difficulty of undertaking any form of acoustic measurement in an occupied residence the 129 Leith Walk measurements are considered adequate. Additionally, the other site measurements, vibration acceleration and vibration source, complete by the Contractor are considered reasonable. The Contractor has completed the surveys in the best practicable terms establishing readings in a busy/built up city centre environment.

Two points should be noted. Firstly, for any given frequency (f) of vibration wave, the vibration acceleration (a) and the vibration velocity (v) are related by the following relationship:

$$a = 2\pi f v$$

A given vibration wave can be transformed into a combination of sine waves at various frequencies and it is necessary to do this to convert vibration acceleration into vibration velocity.

The second point to note is that there are essentially three paths by which vibration energy can be transferred through the earth (surface waves, two types of body waves) and each path has a different way of attenuating vibration energy over distance. Transmission of this energy at each material interface is attenuated in different ways and, in the case of transmission within a building, while the energy is attenuated at certain frequencies, at others it may be amplified because of resonance. Therefore, empirical methods are commonly used in industry to predict vibration levels and, wherever possible, these methods use data on the transmission of vibration energy that have been acquired on site.

3.2. Prediction Analysis

From inspection of sample material provided, it is clear that the Contractor has examined internal ground-borne noise levels in general accordance with the FTA prediction method. A similar prediction method is given in Chapter 13 of "Railway Noise and Vibration Mechanisms, Modelling and Means of Control" by Professor David Thompson (this chapter is stated to have been written by Chris Jones). This method treats the vibrating floor of a room as a noise radiator and makes certain assumptions of the room dimensions and absorption to obtain, by standard acoustic methods, an equation that relates the vibration velocity of the floor to the reverberant sound pressure level within the room. The latest guidance from the Association of Noise Consultants is that, although founded in theory, this equation gives conservative results. It is understood that the FTA prediction method gives values closer to those found in practice. A point was raised regarding the utilisation of vibration velocity formula required by the FTA. Rather than the normal value of 20 the Contractor utilised 30. This was queried and found to be conservative provided the tram speed was assumed to be at least 20 km/h under all circumstances. In this case, it was confirmed that the assumed speed of the tram is always 20 km/h or above which is also conservative. Additionally, The VDV calculations consider the maximum tram frequency of 16 trams per hour per direction which provide a conservative output assuming the maximum service despite actually being lower throughout the timetabled service.

Review of the Contractor analysis output concludes that the documented scheme limit requirements, those in the Noise and Vibration Policy, have been addressed sufficiently. Appendix 4 includes the analysis output demonstrating the Contractors adherence to the values set out.

Appendix 4 includes the route analysis output addressing the Vibration Dose Values required by the Noise and Vibration Policy.

Atkins review of the Contractor's work on vibration has shown that the Contractor is mindful of the criteria laid down in the Noise and Vibration Policy of 2006. As stated above, this Policy gives no criterion for ground-borne noise. However, Atkins has found that, notwithstanding the absence of a specific ground-borne noise criterion, the Contractor has taken steps to control ground-borne noise. Were only the vibration criteria considered, the attenuation measures specified would exceed those required to meet the vibration criteria alone.

Examination of sample predictions provided by the Contractor showed that ground-borne noise predictions had been made for the residential properties using the FTA method.

Although the Contractor has worked with an awareness of ground-borne noise as an issue and has not explicitly stated a criterion, in an Addendum document provided by the Contractor ("Positive Impact of Elastic Track Solutions as Effective Counter-measures against Ground-borne Noise Generated by Edinburgh Trams"), it is clear that within residential properties none of the predicted tram ground-borne noise levels exceeds 40 dB(A).

As may be seen from tables 1 and 2 in Appendix 1, not every tram or railway scheme has adopted a criterion for ground-borne noise and inspection of the values adopted by those schemes that have adopted a criterion shows that 40 dB(A) is a reasonable value. Atkins understands that this is in line with the operational sections of Edinburgh Tram, where no complaints have been received to date in relation to GBN. We therefore consider this to be a robust and proportionate limit for residential properties.

In relation to 129 Leith Walk, the analysis carried out is robust and the solution being constructed fully complies with the specification.

3.2.1. Specific analysis

3.2.1.1. Trackbounds with varying trackform

Atkins questioned the use of two different track forms, on either track bound, at various points along the route. The Contractor has provided demonstration that their analysis considered the specific Contract requirements, namely those within the Noise and Vibration Policy, and the established limits for ground borne noise. In these instances, the Contractor analysis demonstrated that the values are within acceptable limits. It is also expected that, despite no quantifiable example being available as acceptable limits had been maintained, the trench where the trackform is sited will provide attenuation benefits and support overall mitigation.

An example of this is at Edinburgh Playhouse where floating slab track had been specified for the nearer track and soft pad track for the further track. The Contractor responded with a comprehensive explanation of the calculation method, which followed the basic principle of vibrating floors acting as noise radiators. In this case, every horizontal surface in the main hall of the Playhouse has been considered as a sound radiator, appropriate adjustments being made for radiation efficiency. The absorption within the hall was calculated in the normal way by consideration of the areas and absorption coefficients of the various materials. As stated earlier, the prediction of vibration transmission through the ground and its transmission from the ground into the building and upwards is customarily approached empirically owing to the uncertainties involved. Atkins considers that the Contractor's approach has been entirely appropriate. Edinburgh Playhouse is discussed further in section 3.2.1.2.

Section 3.3.3, below, highlights the trackform mitigation measures applied for these works.

3.2.1.2. Edinburgh Playhouse

The tram route, from York Place to Newhaven, feature some more specific sensitive receivers which require greater control.

For some types of non-residential receptors (such as the Edinburgh Playhouse) lower limits would apply. This should be considered on a case-by-case basis and it is clear that the Contractor has done this. Inspection of the Contractor's prediction calculation for the Edinburgh Playhouse shows that the predicted level of ground-borne noise within the auditorium would be 5.2 dB(A) from the nearer track (to which floating slab track will be fitted) and 16.7 dB(A) from the further track (which will be fitted with soft pads). For comparison, the table below is extracted from the HS2 "London West Midlands Environmental Statement - November 2013 - Volume 5 | Technical Appendices Methodology, assumptions and assessment (route-wide) - (sV-001-000) Sound, noise and vibration" of November 2013 (Ref: ES 3.5.0.10):

Table 4: Ground-borne sound impact criteria for non-residential receptors (refer to SMR)

Category of building		Impact (screening) criterion L_{pASmax} [dB]	Potential effect
Code	Description		
G1	Large auditoria; and concert halls	25	Adverse 'A'
G2	Sound recording & broadcast studios; theatres, and small auditoria	30	Adverse 'A'
G3	Places of meeting for religious worship; courts; cinemas; lecture theatres; museums; and small auditoria or halls	35	Adverse 'A'
G4	Offices; schools; colleges, hospitals; hotels; and libraries	40	Adverse 'A'

It may be seen that the most stringent "Impact (screening) criterion L_{pASmax} (dB)", that for "Large auditoria; and concert halls", is some 8 dB higher than the 16.7 dB(A) predicted by the Contractor for the Edinburgh Playhouse. Various aspects of the Contractor's assumptions and calculations have been queried and the responses that have been received have been satisfactory.

In the Addendum previously referred to, additional explanation of the calculations was provided by the Contractor for sample properties. These showed the reasoning that had been followed when determining what track vibration attenuation measures to adopt. The latest version of the "Appendix 2 Vibration" includes predicted vibration accelerations and vibration dose values.

In conclusion, the Contractor applied their professional judgment in an appropriate way following a well-established prediction method and applying appropriate criteria.

3.3. Trackwork mitigation measures

Appendix 3 includes the layout plans highlighting where the varying trackforms have been applied throughout the route. These plans also include correlation to the receivers noted in Appendix 4.

Appendix 4 includes the analysis output highlighting where the varying trackforms have been applied to control noise levels which would exceed acceptability requirements.

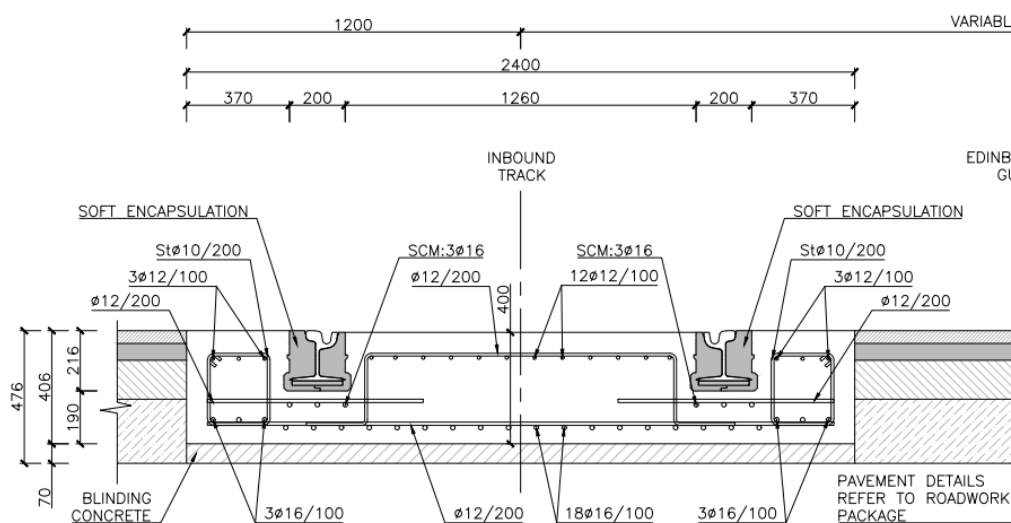
Maintenance of the system, including rolling stock, will assist with overall performance. Maintenance measures that assist in minimising vibration include eliminating track corrugations and other faults by grinding as well as maintaining rolling stock to ensure that, for example, wheel flats are eliminated. It is understood that, in making his recommendations, the Contractor has made allowance for temporary wheel defects (such as flats on the wheel tread) or excessive rail roughness. This makes the predictions more robust as further operational impact is considered.

3.3.1. Standard track

The standard trackform is the solution applied where no additional vibration abatement is required. This utilises the standard Pandrol Q Track products. The standard trackform is itself a resilient/ embedded rail, which provides a degree of vibration noise attenuation. The variants described below provide additional benefits to meet the requirements where necessary.

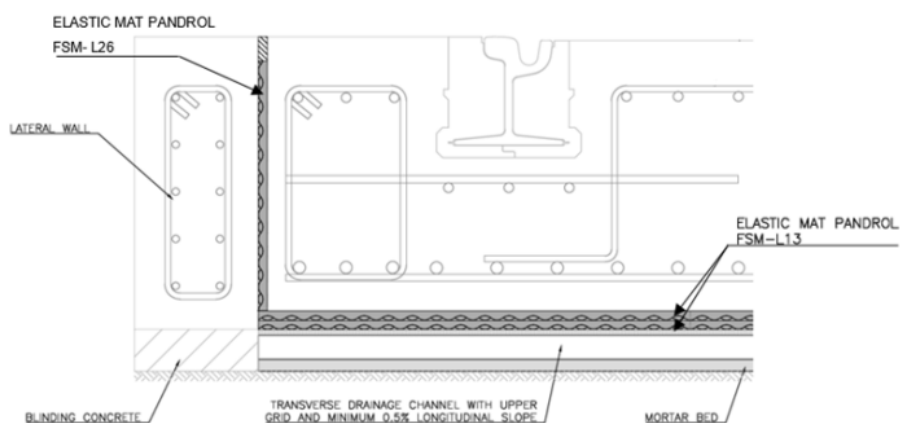
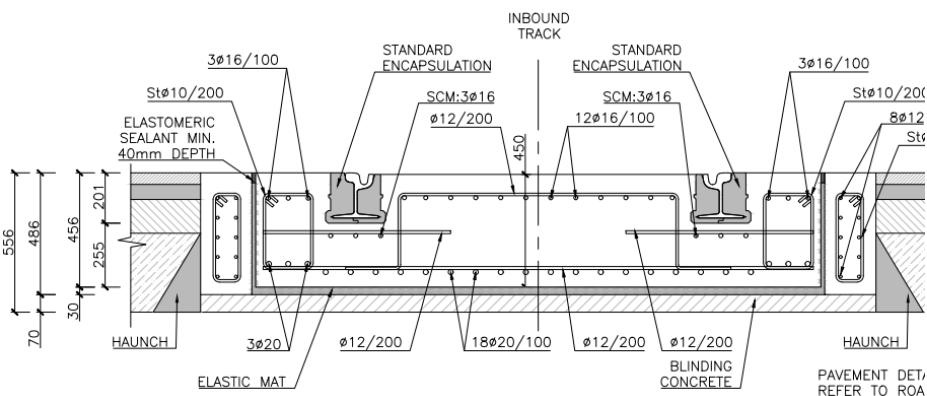
3.3.2. Soft track

The soft pad design typically benefits noise mitigation by 7dB improvement from the standard trackform solution. Structurally, this is the same profile as a standard track section but features a soft pad included within the encapsulation which the rail sits. Example section below.



3.3.3. Floating track

The floating design typically benefits noise mitigation by 15dB improvement from the standard trackform solution. This profile features a slightly different section as it includes for the floating mat which the trackform sits, with overlapping of the sides. The mat itself, is protected and held in place with concrete upstands. Example section and sample application photograph below.



4. Conclusion

The Noise & Vibration Policy's PPV vibration criterion and the noise criteria are all consistent with the relevant Standards and are generally similar to the criteria specified for other tramway and railway projects.

It is considered that the VDV criterion specified in the Noise and Vibration Policy of March 2006 has been applied in the development of this scheme.

Apart from the VDV criterion, the other vibration criterion and the noise criteria are consistent with the relevant Standards and are also considered to be in line with those used on other UK tramway and railway schemes.

The Contractor is following a well-established method for predicting the Noise & Vibration impact of the York Place to Newhaven Tram works.

The Contractor's design has been reviewed and is expected, through the application of the mitigation measures recommended in the form of varying trackform types, to satisfy requirements and regulations.

The varying attenuation measures proposed provide a more than reasonable level of mitigation to address the scheme requirements.

The Contractor has utilised a well-established supplier of trackwork components and there is confidence that the system will perform as intended.

Appendix 1:

Table 1: Various UK Projects' Criteria

Project	VDV Day (16 hour)	VDV Night (8 hour)	PPV	Ground Borne Noise
<i>Edinburgh Tram Extension</i>	<i>0.2 m/s^{1.75}</i>	<i>0.13 m/s^{1.75}</i>	<i>2 mm/s at 2m from the rails</i>	
Crossrail (Information Paper D10)	0.31 m/s ^{1.75} (In the Absence of Appreciable Existing Levels of Vibration)	0.18 m/s ^{1.75} (In the Absence of Appreciable Existing Levels of Vibration)		40 dB L _{Amax,S} (based on JLE, HS1, Thameslink) See note Local authorities preference for 35 dB L _{Amax,S} is stated.
Croydon	0.3 m/s ^{1.75}	0.1 m/s ^{1.75}		40 dB L _{Amax,S}
East West Rail	0.4 m/s ^{1.75}	0.2 m/s ^{1.75}		
HS2 LOAEL (Lowest Observed Adverse Effect Level)	0.2 m/s ^{1.75} (Indoors, centre of any GF dwelling room)	0.1 m/s ^{1.75} (Indoors, centre of any GF dwelling room)		35 dB L _{Amax,S}
HS2 SOAEL (Significant Observed Adverse Effect Level)	0.8 m/s ^{1.75} (Indoors, centre of any GF dwelling room)	0.4 m/s ^{1.75} (Indoors, centre of any GF dwelling room)		45 dB L _{Amax,S}
Manchester (GMPTE)	"BS6472 used to assess"	"BS6472 used to assess"		
Mersey (cancelled)	0.4 m/s ^{1.75}	0.1 m/s ^{1.75}		
Midland Metro (CENTRO)	0.4 m/s ^{1.75}	0.13 m/s ^{1.75}	As BS7385 (50 mm/s for reinforced buildings, 15 mm/s for unreinforced buildings)	
Nottingham	0.4 m/s ^{1.75}	0.13 m/s ^{1.75} (0.1 m/s ^{1.75} for Line 1 only)		

Table 2: Various Countries' Criteria

Country	Daytime Vibration Exposure	Night- time Vibration Exposure	Vibration Event	Ground Borne Noise
Ireland (Railway Procurement Agency – LUAS)	0.4 m/s ^{1.75}	0.13 m/s ^{1.75}	1 mm/s at 6.5m from the track	
France				
Germany			Various – more stringent than UK	
USA - Federal Transit Agency			Various - RMS.	35 dB(A) sleep, 40 dB(A) daytime
Canada - Vancouver Canada Line			72 dBV frequent events ≈ 0.1mm/s (RMS assumed) 80 dBV infrequent events = 0.254mm/s RMS assumed (dB relative 1 microinch/s)	35 dB(A) frequent events 43 dB(A) infrequent events
Canada – Eglinton Crosstown LRT			0.1mm/s RMS for “Residences and buildings where people normally sleep”	35 dB(A)for “Residences and buildings where people normally sleep”
People’s Republic of China			70 dB Daytime for “continuous steady-state vibration, shock vibration and random vibration” (add 10 dB for “shock vibration occurring several times a day”). 67 dB night-time (add 3 dBV for “shock vibration occurring several times a day”). RMS assumed.	Structure-borne noise limits are set for the 31.5Hz, 63Hz, 125Hz and 250Hz octave bands.

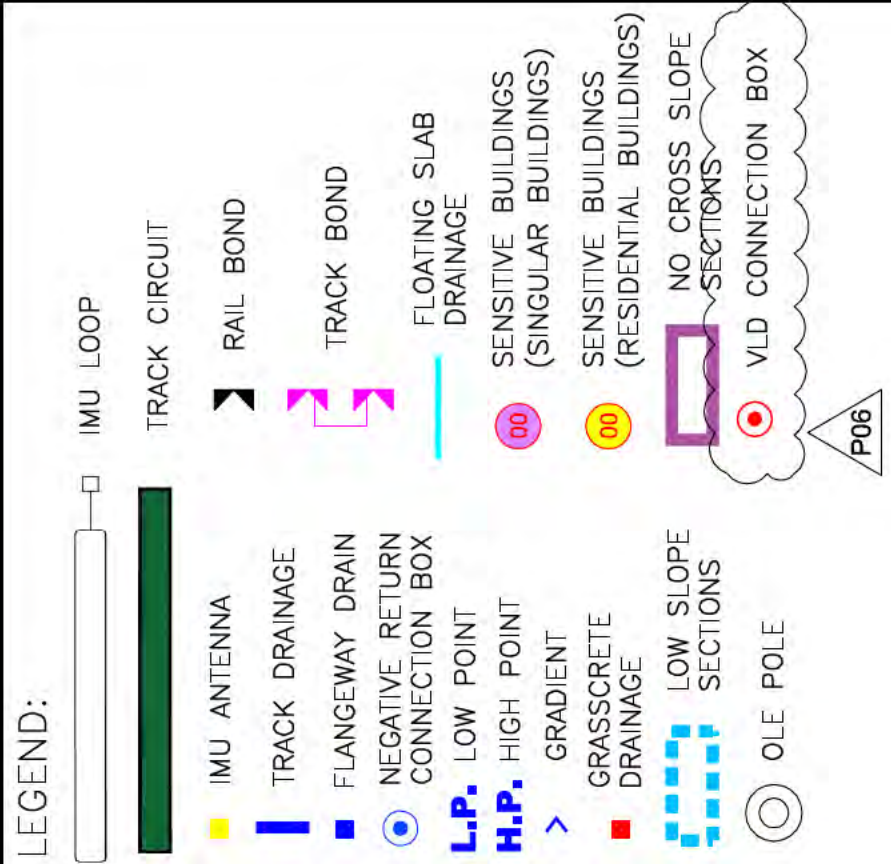
Country	Daytime Vibration Exposure	Night- time Vibration Exposure	Vibration Event	Ground Borne Noise
South Australia			Seems similar to BS6472	Day, 40 dB L _{AMaxS} Night, 35 dB L _{AMaxS}
New South Wales				Development increases existing rail noise levels by 3 dB(A) or more and resulting rail noise levels exceed: Day (7AM-10PM) 40 dB, L _{AMaxS} Night (10PM-7AM) 35 dB, L _{AMaxS}
Victoria	Preferred 0.2m/s ^{1.75} Maximum 0.4m/s ^{1.75}	Preferred 0.13m/s ^{1.75} Maximum 0.26m/s ^{1.75}	similar to BS6472	

Appendix 2: Bibliography

Transit Noise and Vibration Impact Assessment Manual
FTA Report No. 0123
Federal Transit Administration
Prepared by John A. Volpe National Transportation Systems Centre
September 2018

Railway Noise and Vibration Mechanisms, Modelling and Means of Control
Professor David Thompson
Elsevier, First Edition 2009

Appendix 3: Trackwork layout plans



NOTE: FOR CONNECTION DETAILS OF RAIL BONDS, SEE DRAWING:
N-SET-XXX-01-DR-Z-0200 (OLE PACKAGE).
VLD CONNECTION BOXES ARE TO BE PLACED ACCORDING TO THE
LOCATION OF VLD PREPARED IN DRAWINGS.
N-SET-18X-15-DR-Z-0201 TO EYIN-SET-18X-15-DR-Z-0239.
PEDESTRIAN CROSSINGS SHALL BE FINISHED WITH BRUSHED
NOBLETE.

SAFETY HEALTH AND ENVIRONMENTAL INFORMATION

ADDITION TO THE HAZARD/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING INFORMATION AND INFORMATION.

IDENTIFIED RISK ARE NOTE IN ETVN-SEF-XXX-XX-HS-Z-001.
RISK REGISTER, REFER TO RISK REGISTER FOR MITIGATION MEASURES.
RISKS ASSOCIATE WITH THIS WORKS ELEMENT ARE AS FOLLOWS

F. NAME

1. SI EXISTING GROUND
2. TRACKWORKS LOSS OF RAIL BONDING
3. TRACKWORKS WATER AND DERRIS INFILTRATION IN RAIL FIXATION
4. TRACKWORKS CONCRETE DEGRADATION
5. TRACKWORKS CONCRETE CRACKS
6. TRACKWORKS ROLLING STOCK INTERFACE
7. TRACK CIRCUIT FAILURE
8. TRACKWORKS LEADING TO ACCIDENTS
9. TRACKWORKS LEADING TO ACCIDENTS
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99. TRACKWORKS LEADING TO ACCIDENTS
100. TRACKWORKS LEADING TO ACCIDENTS

FOR INFORMATION RELATING TO USE, CLEANING AND MAINTENANCE SEE THE HEALTH AND SAFETY FILE.

IS ASSUMED THAT ALL WORKS WILL BE CARRIED OUT BY A COMPETENT CONTRACTOR WORKING, WHERE APPROPRIATE, TO AN APPROVED METHOD STATEMENT.

Date	Description	Drwn.	Chkd.	Appd.	UPL	IFG	LOB	UPL	ATFL	LOB
10/12/2020	MDU COMMENTS INCLUDED				UPL					
10/11/2020	MDU COMMENTS INCLUDED				UPL					
27/01/2020	FIRST ISSUE				UPL					



Abstract Title:

EDINBURGH TRAM
YORK PLACE TO NEWHAVEN
TRACKWORKS

ing Title:

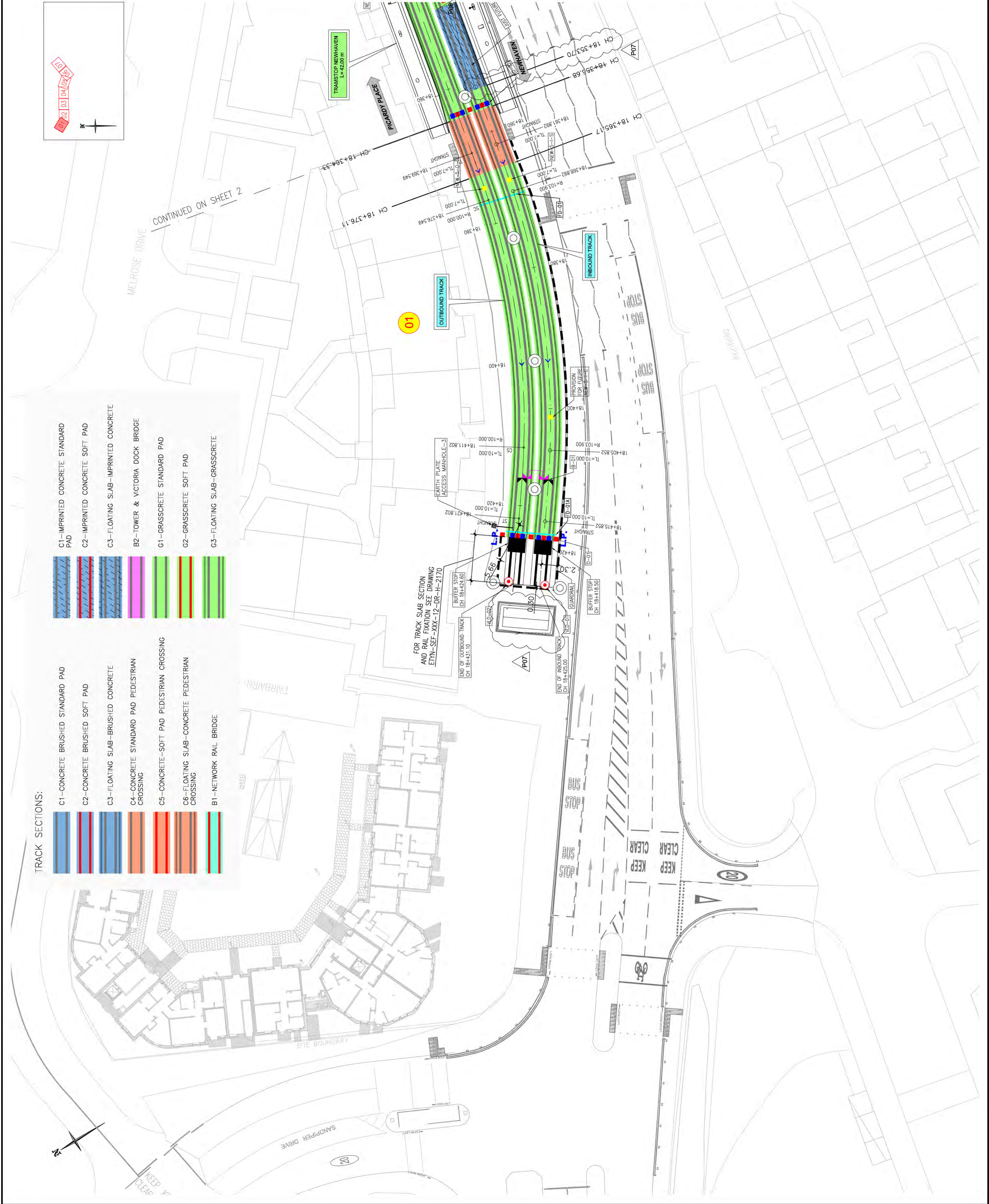
SECTION OCEAN TERMINAL – NEW HAVEN TRACKWORKS LAYOUT

Sheet 1 of 7


Submitted At:	1:250	Status:	FOR COMMENTS AND REVIEW			
By:	UPL	Checked:	AFL	Approved:	LOB	
Date:	14/12/2020	Date:	14/12/2020	Date:	14/12/2020	
Project	Originator	Volume	Location	Type	Rate	Number
ETYN-SEF-XXX-12-DR-H-H-2000						
Library:	Revision:					


ability:


53





LEGEND:


 IMU LOOP


 TRACK CIRCUIT


 IMU ANTENNA


 RAIL BOND


 TRACK DRAINAGE


 FLANGWAY DRAIN


 NEGATIVE RETURN CONNECTION BOX


 FLOATING SLAB DRAINAGE


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
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
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
 SENSITIVE BUILDINGS (SINGULAR BUILDINGS)


 SENSITIVE BUILDINGS (RESIDENTIAL BUILDINGS)

 GRASSCRETE DRAINAGE

 NO CROSS SLOPE SECTIONS

 LOW SLOPE SECTIONS

 VLD CONNECTION BOX

 OLE POLE

NOTE:
1. FOR CONNECTION DETAILS OF RAIL BONDS, SEE DRAWING: ETYN-SEF-XXX-DR-Z-000 (OLE PLACED).
2. VLD CONNECTION BOXES ARE TO BE PLACED, ACCORDING TO THE FINAL LOCATION OF VLD PRESERVED IN DRAWINGS.
3. ETYN-SEF-18X-15-DR-Z-0201 TO ETYN-SEF-18X-15-DR-Z-0239.
3- PEDESTRIAN CROSSINGS SHALL BE FINISHED WITH BRUSHED CONCRETE.

SAFETY HEALTH AND ENVIRONMENTAL INFORMATION
IN ADDITION TO THE HAZARD/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING RISK AND INFORMATION.

IDENTIFIED RISK ARE NOTE IN ETYN-SEF-XXX-XX-HS-Z-001.
RISK REGISTER, REFER TO RISK REGISTER FOR MITIGATION MEASURES.
RISKS ASSOCIATE WITH THIS WORKS ELEMENT ARE AS FOLLOWS

- REF. NAME
- 35 SI EXISTING GROUND
 - 1003 TRACKWORKS LOSS OF RAIL BONDING
 - 1016 TRACKWORKS WATER INFLTRATION IN RAIL FIXATION
 - 1026 TRACKWORKS CONCRETE DEGRADATION
 - 1034 TRACKWORKS CONCRETE CRACKS
 - 1034 TRACKWORKS ROLLING STOCK INTERFACE
 - 137 TRACK CIRCUIT FAILURE
 - 139 FREEZING LEADING TO ACCIDENTS
 - 140 FLOATING SLAB FAILURE
 - 141 DRAINAGE FAILURE LEADING TO ACCIDENTS

FOR INFORMATION RELATING TO USE, CLEANING AND MAINTENANCE SEE THE HEALTH AND SAFETY FILE.

IT IS ASSUMED THAT ALL WORKS WILL BE CARRIED OUT BY A COMPETENT CONTRACTOR WORKING WHERE APPROPRIATE, TO AN APPROVED METHOD STATEMENT.

Rev.	Date	Description	Drawn	Checked	Approved
P08	18/02/2021	MDU COMMENTS INCLUDED	UPL	ATFL	LOB
P07	18/02/2021	MDU COMMENTS INCLUDED	UPL	ATFL	LOB
P01	18/02/2021	FIRST ISSUE	UPL	IEG	LOB

SENER FAIRHURST


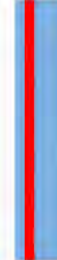












EDINBURGH TRAM
YORK PLACE TO NEWHAVEN
TRACKWORKS

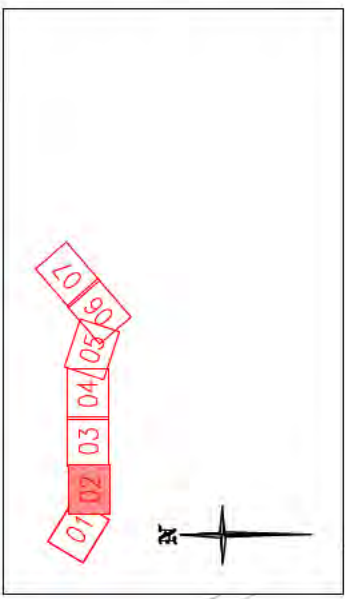
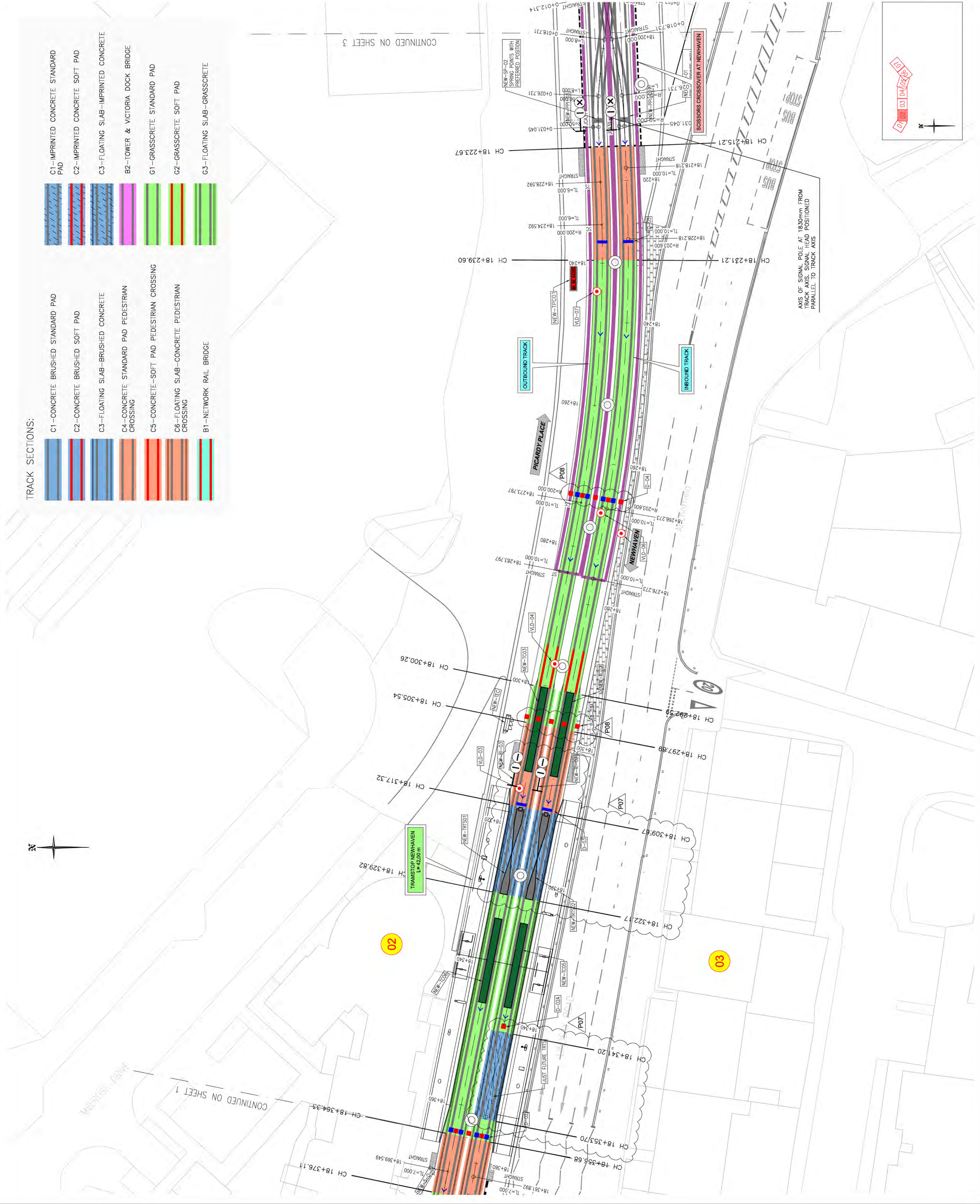
SECTION OCEAN TERMINAL – NEW HAVEN
TRACKWORKS LAYOUT

Sheet 2 of 7


FOR COMMENTS AND REVIEW									
Status: 1:250		Checked		AFLL		Approved: LOB			
Drawn: UPL		Date: 22/02/2021		Date: 22/02/2021		Date: 22/02/2021			
Project		Originator		Volume		Location		Type	
ETYN-SEF-XXX-12-DR-H-2001									
Submittal:					Revision:				
S3					P08				


TRACK SECTIONS:


-  C1-CONCRETE BRUSHED STANDARD PAD
-  C2-CONCRETE BRUSHED SOFT PAD
-  C3-FLOATING SLAB-BRUSHED CONCRETE
-  C4-CONCRETE STANDARD PAD PEDESTRIAN CROSSING
-  C5-CONCRETE-SOFT PAD PEDESTRIAN CROSSING
-  C6-FLOATING SLAB-CONCRETE PEDESTRIAN CROSSING
-  B1-NETWORK RAIL BRIDGE
-  C1-IMPRINTED CONCRETE STANDARD PAD
-  C2-IMPRINTED CONCRETE SOFT PAD
-  C3-FLOATING SLAB-IMPRINTED CONCRETE
-  B2-TOWER & VICTORIA DOCK BRIDGE
-  G1-GRASSCRETE STANDARD PAD
-  G2-GRASSCRETE SOFT PAD
-  G3-FLOATING SLAB-GRASSCRETE





LEGEND:


 IMU LOOP


 TRACK CIRCUIT


 IMU ANTENNA


 RAIL BOND


 TRACK DRAINAGE


 TRACK BOND


 FLANGEWAY DRAIN


 NEGATIVE RETURN CONNECTION BOX


 FLOATING SLAB DRAINAGE


 L.P. LOW POINT


 H.P. HIGH POINT


 GRADIENT


 SENSITIVE BUILDINGS (SINGULAR BUILDINGS)


 SENSITIVE BUILDINGS (RESIDENTIAL BUILDINGS)

 GRASSCRETE DRAINAGE

 NO CROSS SLOPE SECTIONS

 LOW SLOPE SECTIONS

 OLE POLE

 VLD CONNECTION BOX

NOTE:
1- FOR CONNECTION DETAILS OF RAIL BONDS, SEE DRAWING: EYNN-SEF-XXX-12-DR-1-201 TO 2124.
2- EYNN-SEF-XXX-12-DR-1-201 TO 2124.
3- FINAL LOCATION OF VLD PRESERVED IN DRAWINGS.
4- EYNN-SEF-18X-15-DR-2-0201 TO EYNN-SEF-18X-15-DR-2-0239.
5- PEDESTRIAN CROSSINGS SHALL BE FINISHED WITH BRUSHED CONCRETE.

SAFETY HEALTH AND ENVIRONMENTAL INFORMATION
IN ADDITION TO THE HAZARD/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING RISK AND INFORMATION.

IDENTIFIED RISK ARE NOTE IN EYNN-SEF-XXX-XX-HS-Z-001.
RISK REGISTER, REFER TO RISK REGISTER FOR MITIGATION MEASURES.
RISKS ASSOCIATE WITH THIS WORKS ELEMENT ARE AS FOLLOWS

- REF. NAME
- 35 SI EXISTING GROUND
 - 100 TRACKWORKS LOSS OF RAIL BONDING
 - 101 TRACKWORKS LOSS OF RAIL BONDING
 - 102 TRACKWORKS LOSS OF RAIL BONDING
 - 103 TRACKWORKS LOSS OF RAIL BONDING
 - 104 TRACKWORKS LOSS OF RAIL BONDING
 - 105 TRACKWORKS LOSS OF RAIL BONDING
 - 106 TRACKWORKS LOSS OF RAIL BONDING
 - 107 TRACKWORKS LOSS OF RAIL BONDING
 - 108 TRACKWORKS LOSS OF RAIL BONDING
 - 109 TRACKWORKS LOSS OF RAIL BONDING
 - 110 TRACKWORKS LOSS OF RAIL BONDING
 - 111 TRACKWORKS LOSS OF RAIL BONDING
 - 112 TRACKWORKS LOSS OF RAIL BONDING
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 - 121 TRACKWORKS LOSS OF RAIL BONDING
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 - 124 TRACKWORKS LOSS OF RAIL BONDING
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 - 136 TRACKWORKS LOSS OF RAIL BONDING
 - 137 TRACKWORKS LOSS OF RAIL BONDING
 - 138 TRACKWORKS LOSS OF RAIL BONDING
 - 139 TRACKWORKS LOSS OF RAIL BONDING
 - 140 TRACKWORKS LOSS OF RAIL BONDING
 - 141 TRACKWORKS LOSS OF RAIL BONDING

FOR INFORMATION RELATING TO USE, CLEANING AND MAINTENANCE SEE THE HEALTH AND SAFETY FILE.

IT IS ASSUMED THAT ALL WORKS WILL BE CARRIED OUT BY A COMPETENT CONTRACTOR WORKING, WHERE APPROPRIATE, TO AN APPROVED METHOD STATEMENT.

Rev.	Date	Description	Drawn	Checked	Approved
P08	18/02/2021	MDU COMMENTS INCLUDED	UPL	ATFL	LOB
P07	18/02/2021	MDU COMMENTS INCLUDED	UPL	ATFL	LOB
P01	18/02/2021	FIRST ISSUE	UPL	EG	LOB




Project Title:
**EDINBURGH TRAM
YORK PLACE TO NEWHAVEN
TRACKWORKS**


Section Title:
**SECTION OCEAN TERMINAL – NEW HAVEN
TRACKWORKS LAYOUT**


Sheet 3 of 7


Scale of A3:	Status:	FOR COMMENTS AND REVIEW		
1:250	Drawn:	UPL	Checked:	ATFL
	Approved:	LOB		
Date:	Date:	Date:	Date:	Date:
22/02/2021	22/02/2021	22/02/2021	22/02/2021	22/02/2021
Project:	Originator:	Volume:	Location:	Type:
EYNN-SEF-XXX-12-DR-H-2002				Number
Submittal:	Revision:	P08		


TRACK SECTIONS:


- 


C1-CONCRETE BRUSHED STANDARD PAD
- 

C2-CONCRETE BRUSHED SOFT PAD
- 


C3-FLOATING SLAB-BRUSHED CONCRETE
- 


C4-CONCRETE STANDARD PAD PEDESTRIAN CROSSING
- 


C5-CONCRETE-SOFT PAD PEDESTRIAN CROSSING
- 


C6-FLOATING SLAB-CONCRETE PEDESTRIAN CROSSING
- 


B1-NETWORK RAIL BRIDGE


- 


C1-IMPRINTED CONCRETE STANDARD PAD
- 

C2-IMPRINTED CONCRETE SOFT PAD
- 

C3-FLOATING SLAB-IMPRINTED CONCRETE
- 

B2-TOWER & VICTORIA DOCK BRIDGE
- 

G1-GRASSCRETE STANDARD PAD
- 

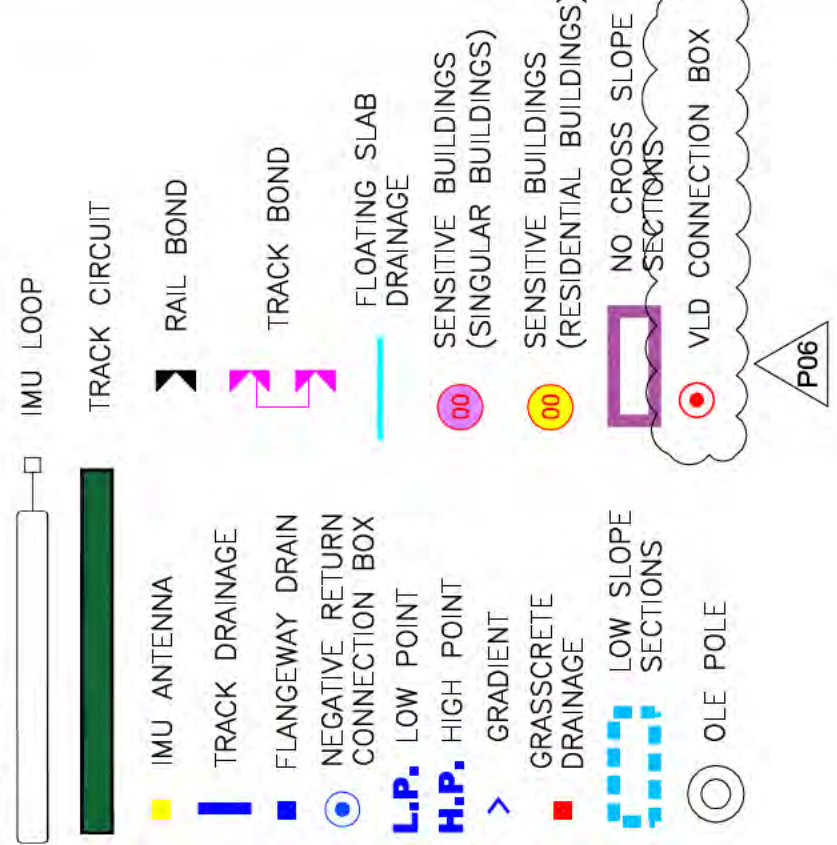
G2-GRASSCRETE SOFT PAD
- 

G3-FLOATING SLAB-GRASSCRETE

CONTINUED ON SHEET 2

CONTINUED ON SHEET 4

LEGEND:



NOTE:
1. FOR CONNECTION DETAILS OF RAIL BONDS, SEE DRAWING: ETYN-SEF-XXX-DR-7-000. (OLE PLACED ACCORDING TO THE FINAL LOCATION OF VLD PRESERVED IN DRAWINGS)
2. ETYN-SEF-18X-15-DR-7-0201, TO ETYN-SEF-18X-15-DR-7-0239.
3. PEDESTRIAN CROSSINGS SHALL BE FINISHED WITH BRUSHED CONCRETE.

SAFETY HEALTH AND ENVIRONMENTAL INFORMATION

IN ADDITION TO THE HAZARD/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING RISK AND INFORMATION.

IDENTIFIED RISK ARE NOTE IN ETYN-SEF-XXX-XX-HS-Z-001. RISK REGISTER, REFER TO RISK REGISTER FOR MITIGATION MEASURES. RISKS ASSOCIATE WITH THIS WORKS ELEMENT ARE AS FOLLOWS

REF: N/A

- 35 SI EXISTING GROUND
1003 TRACKWORKS LOSS OF RAIL BONDING
1010 TRACKWORKS WATER INFLTRATION IN RAIL FLATION
1016 TRACKWORKS CONCRETE DEGRADATION
1034 TRACKWORKS CONCRETE CRACKS
1034 TRACKWORKS ROLLING STOCK INTERFACE
137 TRACK CIRCUIT FAILURE
139 FREEZING LEADING TO ACCIDENTS
140 FLOATING SLAB FAILURE
141 DRAINAGE FAILURE LEADING TO ACCIDENTS

FOR INFORMATION RELATING TO USE, CLEANING AND MAINTENANCE SEE THE HEALTH AND SAFETY FILE.

IT IS ASSUMED THAT ALL WORKS WILL BE CARRIED OUT BY A COMPETENT CONTRACTOR WORKING, WHERE APPROPRIATE, TO AN APPROVED METHOD STATEMENT.

Rev.	Date	Description	Drawn	Checked	Approved
P06	18/11/2020	MDU COMMENTS INCLUDED	UPL	ATFL	LOB
P05	18/11/2020	MDU COMMENTS INCLUDED	UPL	ATFL	LOB
P01	18/11/2020	FIRST ISSUE	UPL	EG	LOB



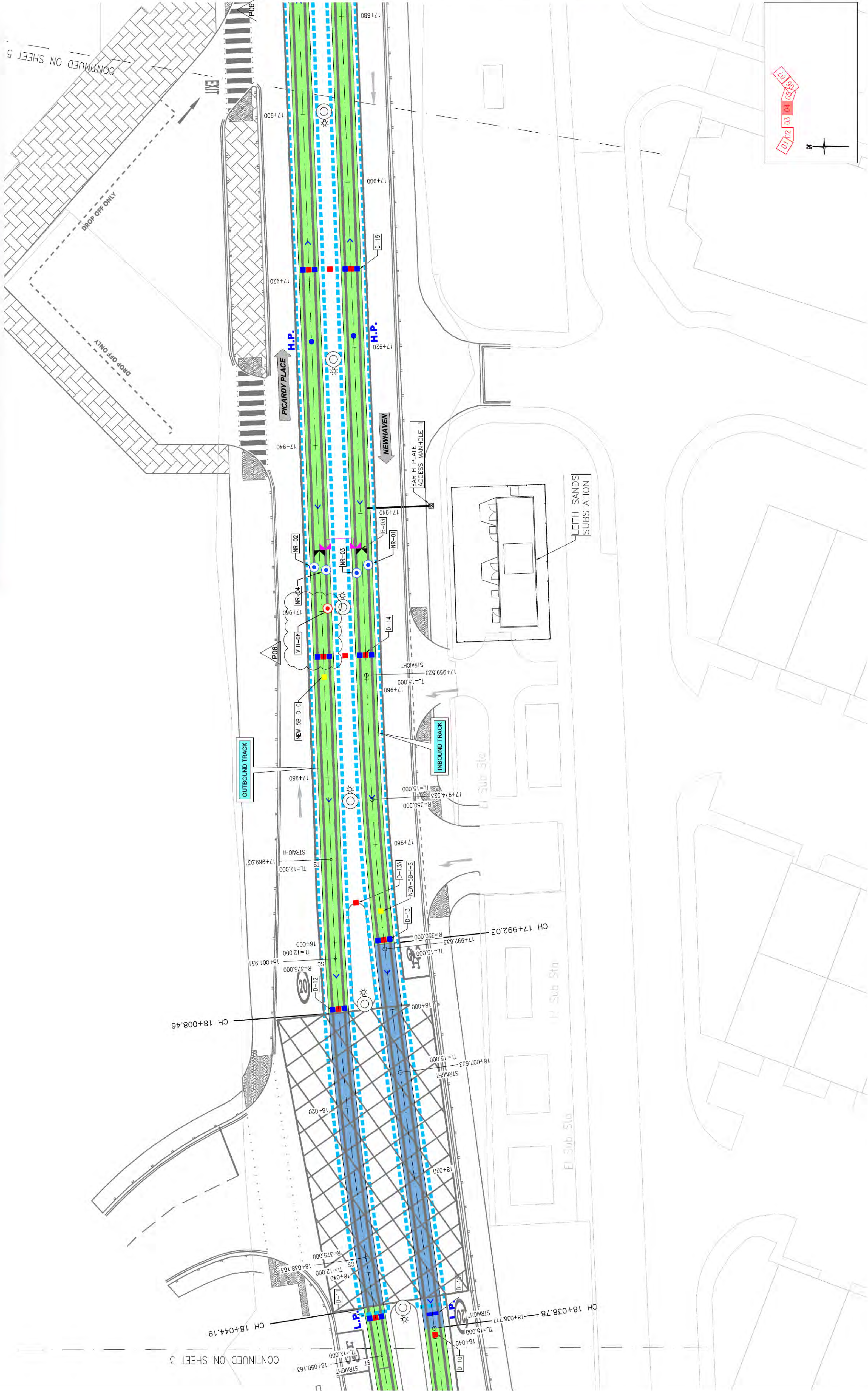
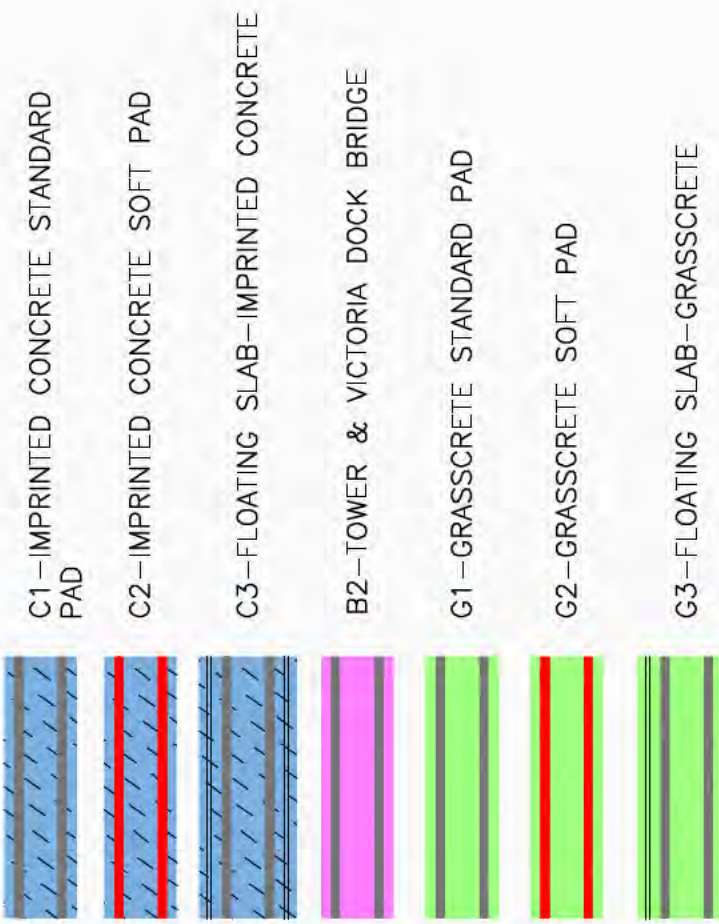
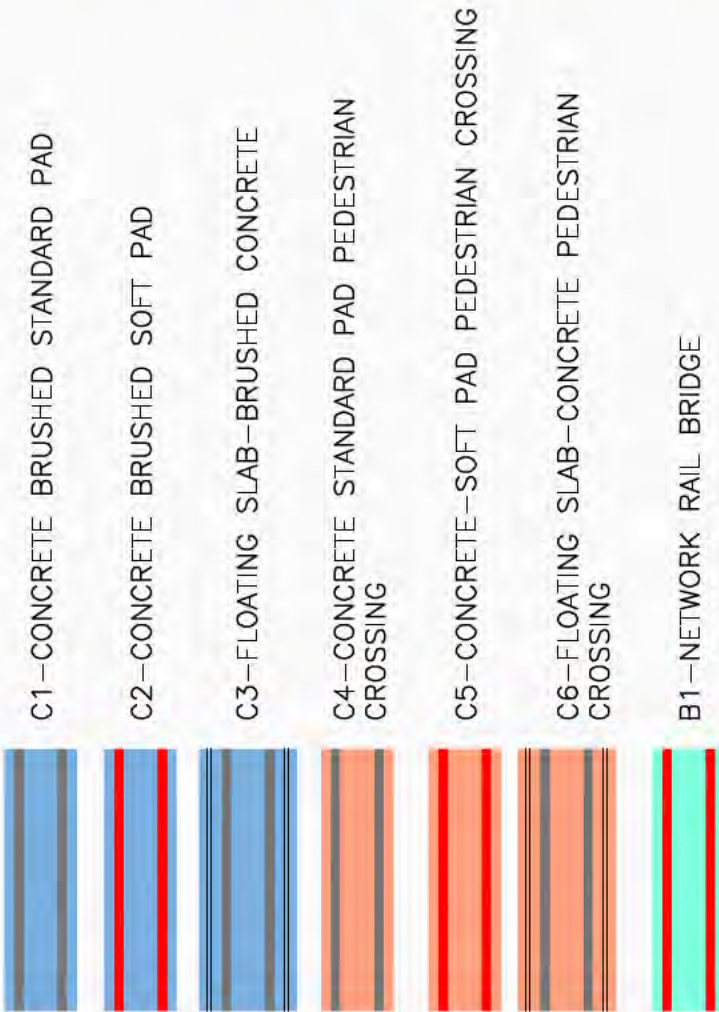
EDINBURGH TRAM
YORK PLACE TO NEWHAVEN
TRACKWORKS

SECTION OCEAN TERMINAL – NEW HAVEN
TRACKWORKS LAYOUT

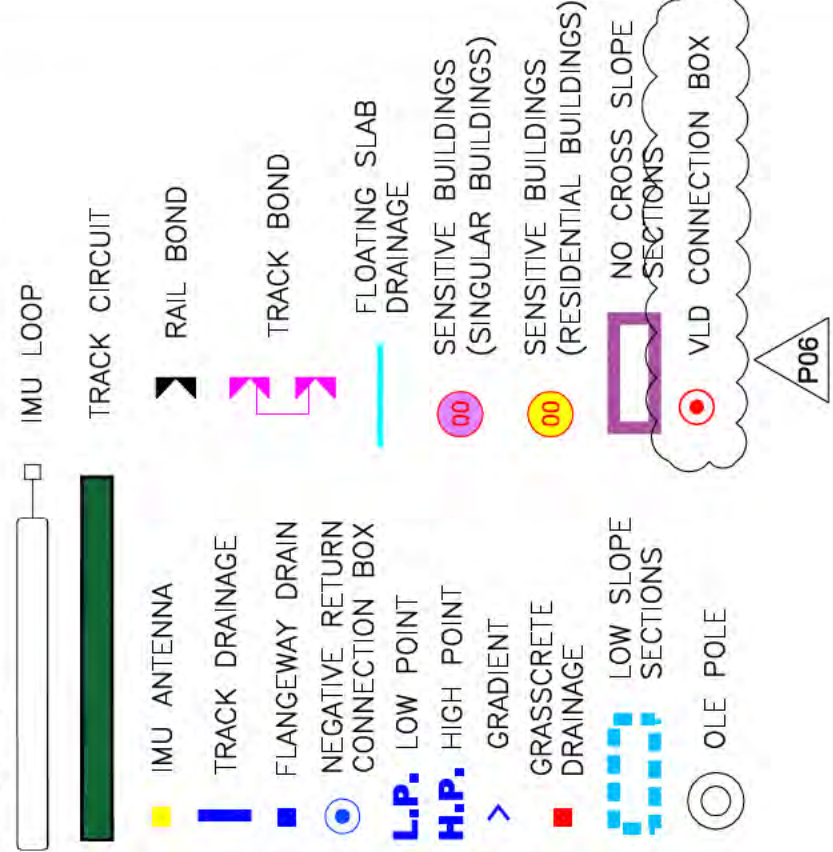
Sheet 4 of 7

Scale of A3:	Status	FOR COMMENTS AND REVIEW		
1:250	Drawn: UPL	Checked: AFL	Approved: LOB	
Date: 18/11/2020	Date: 18/11/2020	Date: 18/11/2020	Date: 18/11/2020	
Project: ETYN-SEF-XXX-12-DR-H-2003	Originator: Volume	Location: Type	Role: Number	
Submitter: S3	Revision: P06			

TRACK SECTIONS:



LEGEND:



NOTE:
FOR CONNECTION DETAILS OF RAIL BONDS, SEE DRAWING:
ETYN-SEF-XXX-DR-Z-000 (OLE PLACED)
2- VLD CONNECTION BOXES ARE TO BE PLACED, ACCORDING TO THE FINAL LOCATION OF VLD PRESERVED IN DRAWINGS.
ETYN-SEF-18X-15-DR-Z-0201 TO ETYN-SEF-18X-15-DR-Z-0239
3- PEDESTRIAN CROSSINGS SHALL BE FINISHED WITH BRUSHED CONCRETE.

SAFETY HEALTH AND ENVIRONMENTAL INFORMATION

IN ADDITION TO THE HAZARD/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING RISK AND INFORMATION.

IDENTIFIED RISK ARE NOTE IN ETYN-SEF-XXX-XX-HS-Z-001.
RISK REGISTER. REFER TO RISK REGISTER FOR MITIGATION MEASURES.
RISKS ASSOCIATE WITH THIS WORKS ELEMENT ARE AS FOLLOWS

REF: NWE

- 35 SI EXISTING GROUND
100% TRACKWORKS LOSS OF RAIL BONDING
101% TRACKWORKS WATERLOGGING AND INFILTRATION IN RAIL FLATION
102% TRACKWORKS CONCRETE DEGRADATION
103% TRACKWORKS CONCRETE CRACKS
104 TRACKWORKS ROLLING STOCK INTERFACE
137 TRACK CIRCUIT FAILURE
139 FREEZING LEADING TO ACCIDENTS
140 FLOATING SLAB FAILURE
141 DRAINAGE FAILURE LEADING TO ACCIDENTS

FOR INFORMATION RELATING TO USE, CLEANING AND MAINTENANCE SEE THE HEALTH AND SAFETY FILE.

IT IS ASSUMED THAT ALL WORKS WILL BE CARRIED OUT BY A COMPETENT CONTRACTOR WORKING, WHERE APPROPRIATE, TO AN APPROVED METHOD STATEMENT.

Rev.	Date	Description	Drawn	Checked	Revised
P07	16/11/2021	MDU COMMENTS INCLUDED	UPL	AFL	LOB
P06	16/11/2021	MDU COMMENTS INCLUDED	UPL	AFL	LOB
P01	14/10/2021	FIRST ISSUE	UPL	EG	LOB



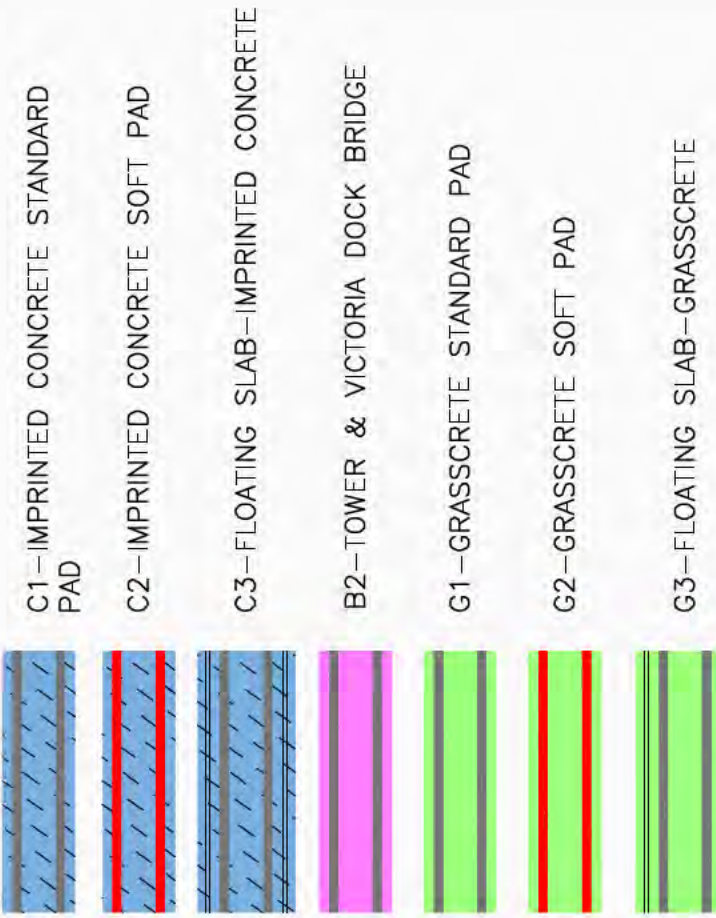
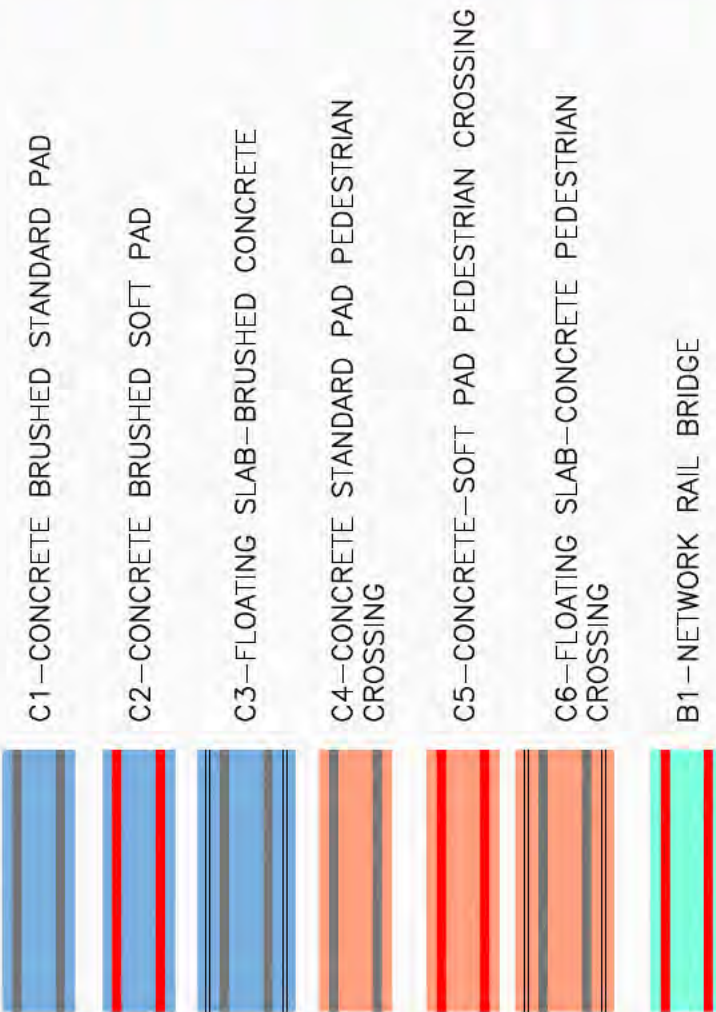
EDINBURGH TRAM
YORK PLACE TO NEWHAVEN
TRACKWORKS

SECTION OCEAN TERMINAL – NEW HAVEN
TRACKWORKS LAYOUT

Sheet 5 of 7

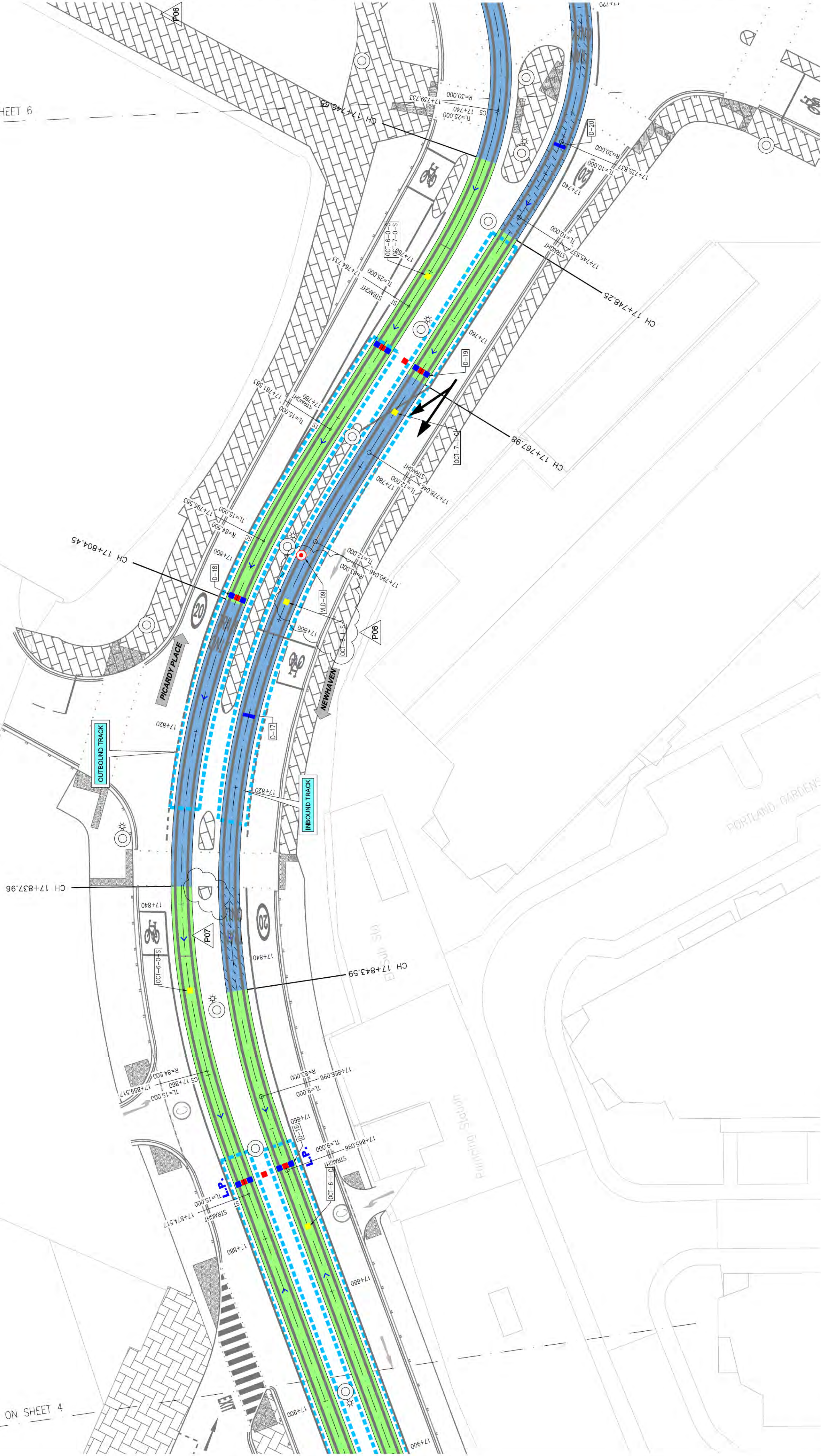
FOR COMMENTS AND REVIEW	
Status:	26/01/2021
Drawn:	UPL
Checked:	AFL
Date:	26/01/2021
Project:	Originator
Volume:	Location
Type:	26/01/2021
Rate:	26/01/2021
Number:	26/01/2021
ETYN-SEF-XXX-12-DR-H-2004	
Sublibrary:	Revision:
S3	P07

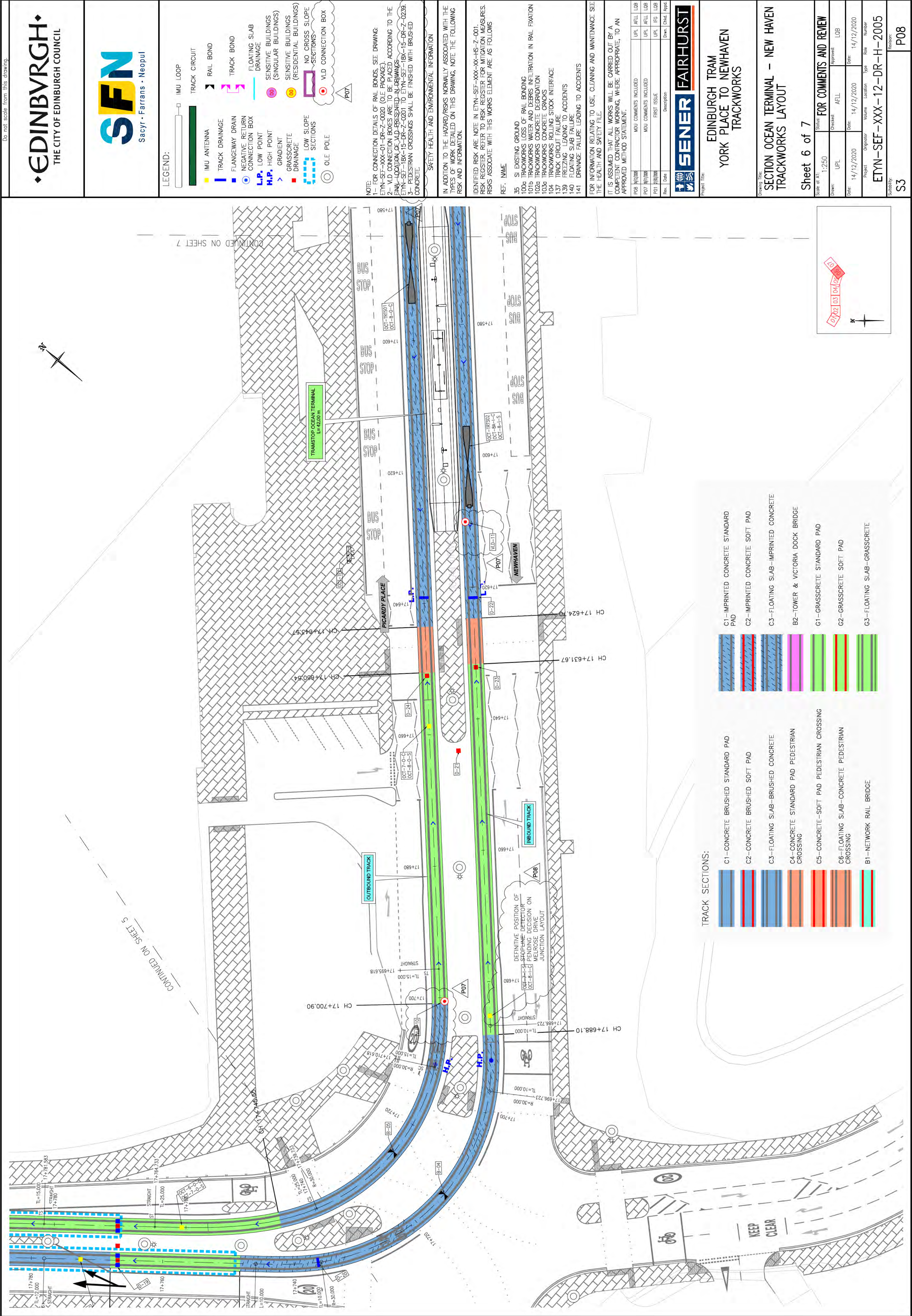
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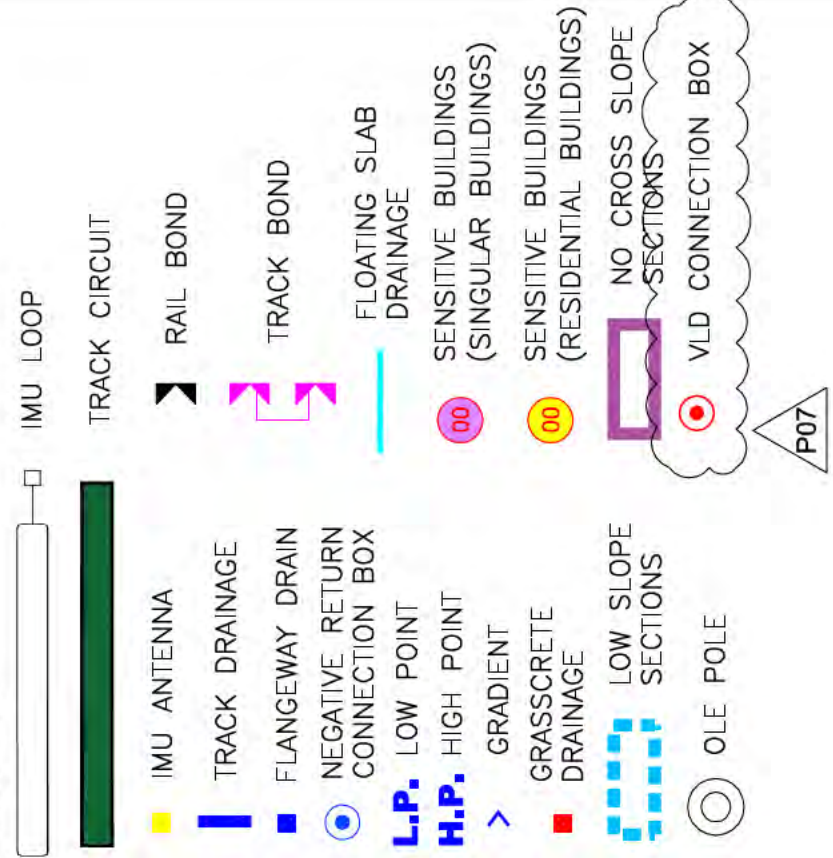
CONTINUED ON SHEET 6

CONTINUED ON SHEET 4





LEGEND:



NOTE: FOR CONNECTION DETAILS OF RAIL BONDS, SEE DRAWING: ETYN-SEF-XXX-12-DR-H-2125 TO 2129.
2. ALL CONNECTION BOXES ARE TO BE PLACED ACCORDING TO THE FINAL LOCATION OF VLD PRESERVED IN DRAWINGS.
ETYN-SEF-18X-15-DR-Z-0201 TO ETYN-SEF-18X-15-DR-Z-0239.
3- PEDESTRIAN CROSSINGS SHALL BE FINISHED WITH BRUSHED CONCRETE.

SAFETY HEALTH AND ENVIRONMENTAL INFORMATION
IN ADDITION TO THE HAZARD/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING RISK AND INFORMATION.

IDENTIFIED RISK ARE NOTE IN ETYN-SEF-XXX-XX-HS-Z-001.
RISK REGISTER, REFER TO RISK REGISTER FOR MITIGATION MEASURES. RISKS ASSOCIATE WITH THIS WORKS ELEMENT ARE AS FOLLOWS

REF. NAME
35 SI EXISTING GROUND
1001 TRACKWORKS LOSS OF RAIL BONDING
1010 TRACKWORKS WATERLOGGING AND INFILTRATION IN RAIL FIXATION
1020 TRACKWORKS CONCRETE DEGRADATION
1030 TRACKWORKS CONCRETE CRACKS
104 TRACKWORKS ROLLING STOCK INTERFACE
137 TRACK CIRCUIT FAILURE
139 FREEZING LEADING TO ACCIDENTS
140 FLOATING SLAB FAILURE
141 DRAINAGE FAILURE LEADING TO ACCIDENTS

FOR INFORMATION RELATING TO USE, CLEANING AND MAINTENANCE SEE THE HEALTH AND SAFETY FILE.

IT IS ASSUMED THAT ALL WORKS WILL BE CARRIED OUT BY A COMPETENT CONTRACTOR WORKING, WHERE APPROPRIATE, TO AN APPROVED METHOD STATEMENT.

Rev.	Date	Description	Drawn	Checked	Approved
P07	18/11/2020	MDU COMMENTS INCLUDED	UPL	ATFL	LOB
P06	18/11/2020	MDU COMMENTS INCLUDED	UPL	ATFL	LOB
P01	18/11/2020	FIRST ISSUE	UPL	IEG	LOB

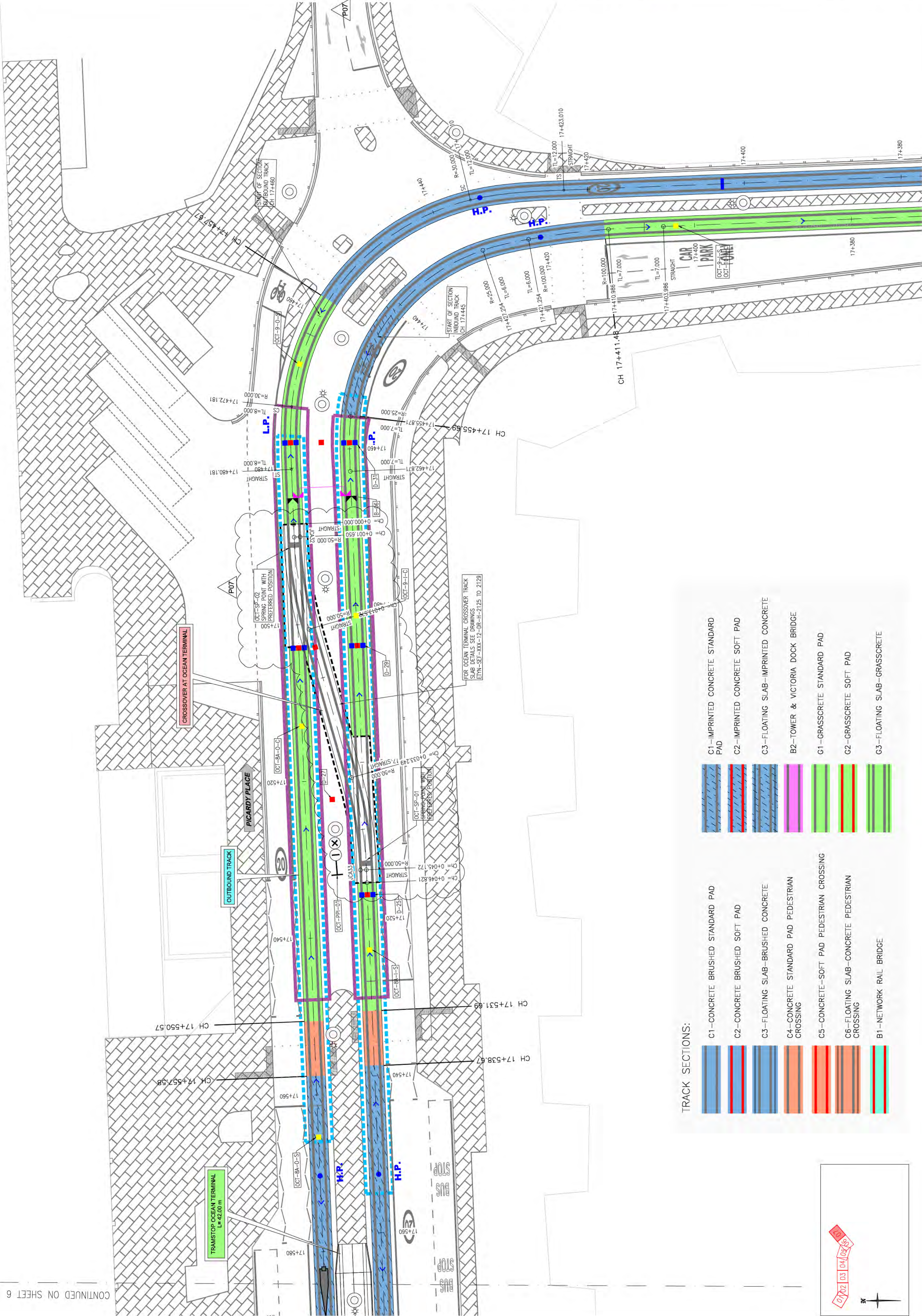


Project Title:
**EDINBURGH TRAM
YORK PLACE TO NEWHAVEN
TRACKWORKS**

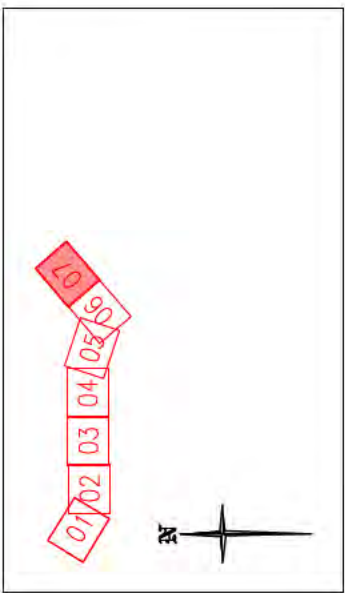
Section Title:
**SECTION OCEAN TERMINAL – NEW HAVEN
TRACKWORKS LAYOUT**

Sheet 7 of 7

Scale of A1:	1:250	Status:	FOR COMMENTS AND REVIEW
Drawn:	UPL	Checked:	AFL
Date:	18/11/2020	Date:	18/11/2020
Project:	Originator	Volume	Location
ETYN-SEF-XXX-12-DR-H-2006		Type	Role
Number		Number	
Submittal:		Revision:	
S3		P07	



CONTINUED ON SHEET 6



LEGEND:

IMU LOOP

TRACK CIRCUIT

IMU ANTENNA

TRACK DRAINAGE

FLANGWAY DRAIN

NEGATIVE RETURN CONNECTION BOX

L.P. LOW POINT

H.P. HIGH POINT

GRASSCRETE

GRASSCRETE DRAINAGE

LOW SLOPE SECTIONS

NO CROSS SLOPE SECTIONS

VLD CONNECTION BOX

OLE POLE

RAIL BOND

TRACK BOND

CONNECTION TO STRAY CURRENT COLLECTOR SYSTEM OF PHASE 1

CONNECTION TO STRAY CURRENT COLLECTOR SYSTEM OF PHASE 1

SENSITIVE BUILDINGS (SINGULAR BUILDINGS)

SENSITIVE BUILDINGS (RESIDENTIAL BUILDINGS)

NO CROSS SLOPE SECTIONS

VLD CONNECTION BOX

NOTE: FOR CONNECTION DETAILS OF RAIL BONDS SEE DRAWING: /P05/ EYNN-SEF-XXX-DR-Z-020 (OLE BRIDGE) EYNN-SEF-XXX-DR-Z-021 (OLE BRIDGE) VLD CONNECTION BOXES ARE TO BE PLACED ACCORDING TO THE FINAL LOCATION OF VLD PRESENTED IN DRAWINGS EYNN-SEF-18X-15-DR-Z-0201 TO EYNN-SEF-18X-15-DR-Z-0239 3- PEDESTRIAN CROSSINGS SHALL BE FINISHED WITH BRUSHED CONCRETE.

SAFETY HEALTH AND ENVIRONMENTAL INFORMATION

IN ADDITION TO THE HAZARD/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING RISK AND INFORMATION.

IDENTIFIED RISK ARE NOTE IN EYNN-SEF-XXX-XX-HS-Z-001. RISK REGISTER, REFER TO RISK REGISTER FOR MITIGATION MEASURES. RISKS ASSOCIATE WITH THIS WORKS ELEMENT ARE AS FOLLOWS

REF. NAME

- 35 SI EXISTING GROUND
- 76 SLAB OVER 275KV CABLES
- 82 RESTRICTED DEPTH (TOWER PLACE BRIDGE)
- 84 RESTRICTED DEPTH (VICTORIA QUAY BRIDGE)
- 100A TRACKWORKS LOSS OF RAIL BONDING
- 100B TRACKWORKS LOSS OF RAIL BONDING
- 102A TRACKWORKS CONCRETE DEGRADATION
- 102B TRACKWORKS CONCRETE CRACKS
- 104 TRACKWORKS ROLLING STOCK INTERFACE
- 114 SPEN 275KV
- 139 FREEZING LEADING TO ACCIDENTS
- 140 FLOATING SLAB FAILURE
- 141 DRAINAGE FAILURE LEADING TO ACCIDENTS

FOR INFORMATION RELATING TO USE, CLEANING AND MAINTENANCE SEE THE HEALTH AND SAFETY FILE.

IT IS ASSUMED THAT ALL WORKS WILL BE CARRIED OUT BY A COMPETENT CONTRACTOR WORKING, WHERE APPROPRIATE, TO AN APPROVED METHOD STATEMENT.

Rev.	Date	Description	Drawn	Checked	Approved
P05	18/11/2020	MDU COMMENTS INCLUDED	UPL	AFL	LOB
P04	18/11/2020	MDU COMMENTS INCLUDED	UPL	AFL	LOB
P01	18/11/2020	FIRST ISSUE	UPL	EG	LOB



Project Title:

EDINBURGH TRAM
YORK PLACE TO NEWHAVEN
TRACKWORKS

Drawing Title:

SECTION YORK PLACE – OCEAN TERMINAL
TRACKWORKS LAYOUT

Sheet 1 of 24

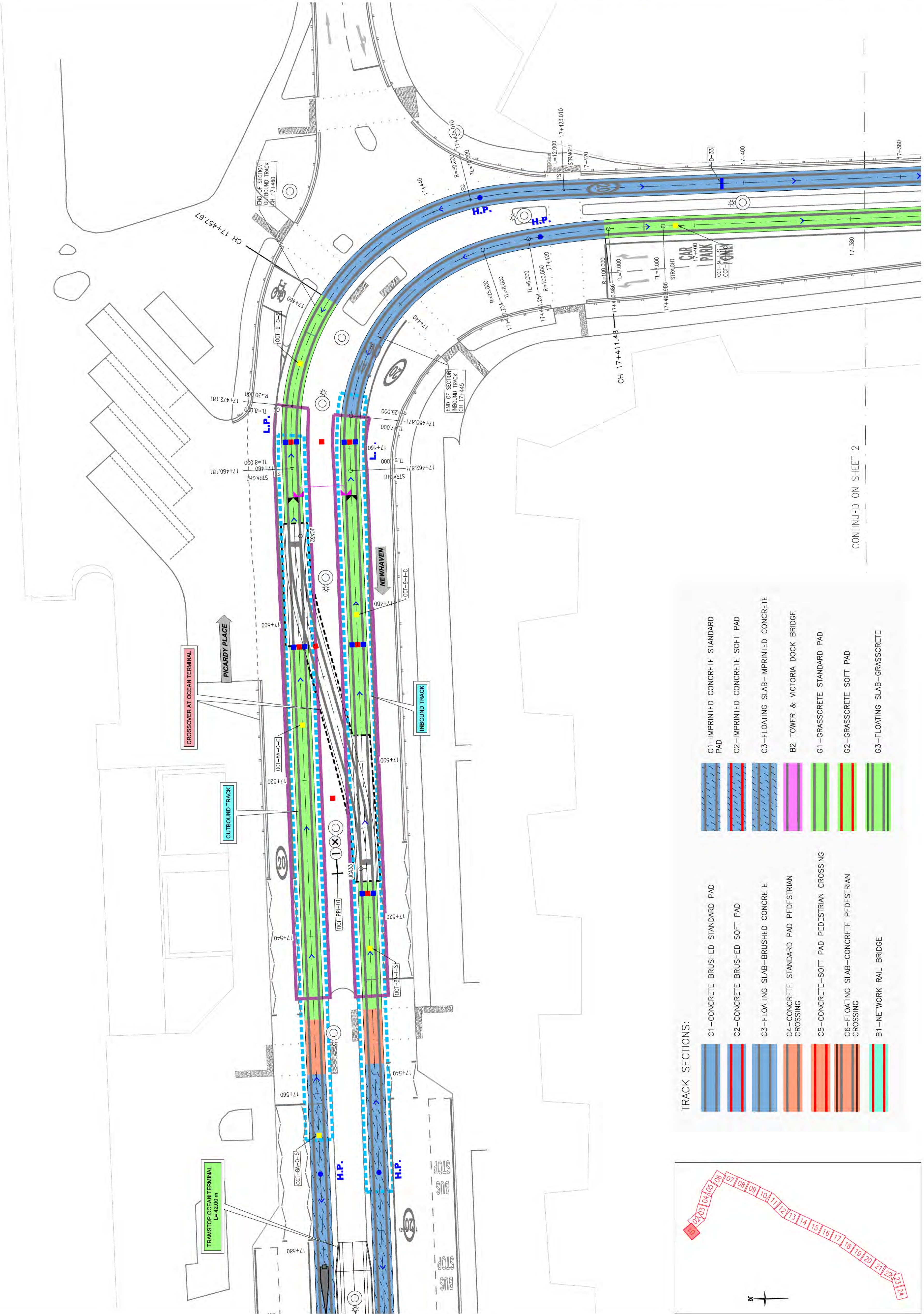
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Date: 18/11/2020	Date: 18/11/2020
Project Originator: Volume	Location: Type
Role: Number	

EYNN-SEF-XXX-12-DR-H-2500

Submittal:

S3

P05



TRACK SECTIONS:

C1-CONCRETE BRUSHED STANDARD PAD

C2-CONCRETE BRUSHED SOFT PAD

C3-FLOATING SLAB-BRUSHED CONCRETE

C4-CONCRETE STANDARD PAD PEDESTRIAN CROSSING

C5-CONCRETE-SOFT PAD PEDESTRIAN CROSSING

C6-FLOATING SLAB-CONCRETE PEDESTRIAN CROSSING

B1-NETWORK RAIL BRIDGE

C1-IMPRINTED CONCRETE STANDARD PAD

C2-IMPRINTED CONCRETE SOFT PAD

C3-FLOATING SLAB-IMPRINTED CONCRETE

B2-TOWER & VICTORIA DOCK BRIDGE

G1-GRASSCRETE STANDARD PAD

G2-GRASSCRETE SOFT PAD

G3-FLOATING SLAB-GRASSCRETE

CONTINUED ON SHEET 2

LEGEND:

IMU LOOP

TRACK CIRCUIT

IMU ANTENNA

RAIL BOND

TRACK DRAINAGE

FLANGEWAY DRAIN

NEGATIVE RETURN CONNECTION BOX

L.P. LOW POINT

H.P. HIGH POINT

GRASSCRETE DRAINAGE

LOW SLOPE SECTIONS

NO CROSS SLOPE SECTIONS

VLD CONNECTION BOX

OLE POLE

CONNECTION TO STRAY CURRENT COLLECTOR SYSTEM OF PHASE 1

FLOATING SLAB DRAINAGE

SENSITIVE BUILDINGS (SINGULAR BUILDINGS)

SENSITIVE BUILDINGS (RESIDENTIAL BUILDINGS)

NO CROSS SLOPE SECTIONS

VLD CONNECTION BOX

NOTE: FOR CONNECTION DETAILS OF RAIL BONDS SEE DRAWING: P05
ETYN-SEF-XXX-DR-Z-020 (OLE BRIDGE)
2. VLD CONNECTION BOXES ARE TO BE PLACED ACCORDING TO THE FINAL LOCATION OF VLD PRESENTED IN DRAWINGS
ETYN-SEF-18X-15-DR-Z-0201 TO ETYN-SEF-18X-15-DR-Z-0239.
3. PEDESTRIAN CROSSINGS SHALL BE FINISHED WITH BRUSHED CONCRETE.

SAFETY HEALTH AND ENVIRONMENTAL INFORMATION

IN ADDITION TO THE HAZARD/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING RISK AND INFORMATION.

IDENTIFIED RISK ARE NOTE IN ETYN-SEF-XXX-XX-HS-Z-001.
RISK REGISTER, REFER TO RISK REGISTER FOR MITIGATION MEASURES.
RISKS ASSOCIATE WITH THIS WORKS ELEMENT ARE AS FOLLOWS

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- 102B TRACKWORKS CONCRETE DEGRADATION
- 103A TRACKWORKS CONCRETE CRACKS
- 104 TRACKWORKS ROLLING STOCK INTERFACE
- 114 SPEN 275KV
- 139 FREEZING LEADING TO ACCIDENTS
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FOR INFORMATION RELATING TO USE, CLEANING AND MAINTENANCE SEE THE HEALTH AND SAFETY FILE.

IT IS ASSUMED THAT ALL WORKS WILL BE CARRIED OUT BY A COMPETENT CONTRACTOR WORKING, WHERE APPROPRIATE, TO AN APPROVED METHOD STATEMENT.

Rev.	Date	Description	Drawn	Checked	Approved
P05	18/11/2020	MDU COMMENTS INCLUDED	UPL	AFLL	LOB
P04	18/11/2020	MDU COMMENTS INCLUDED	UPL	AFLL	LOB
P01	18/11/2020	FIRST ISSUE	UPL	AFLL	LOB

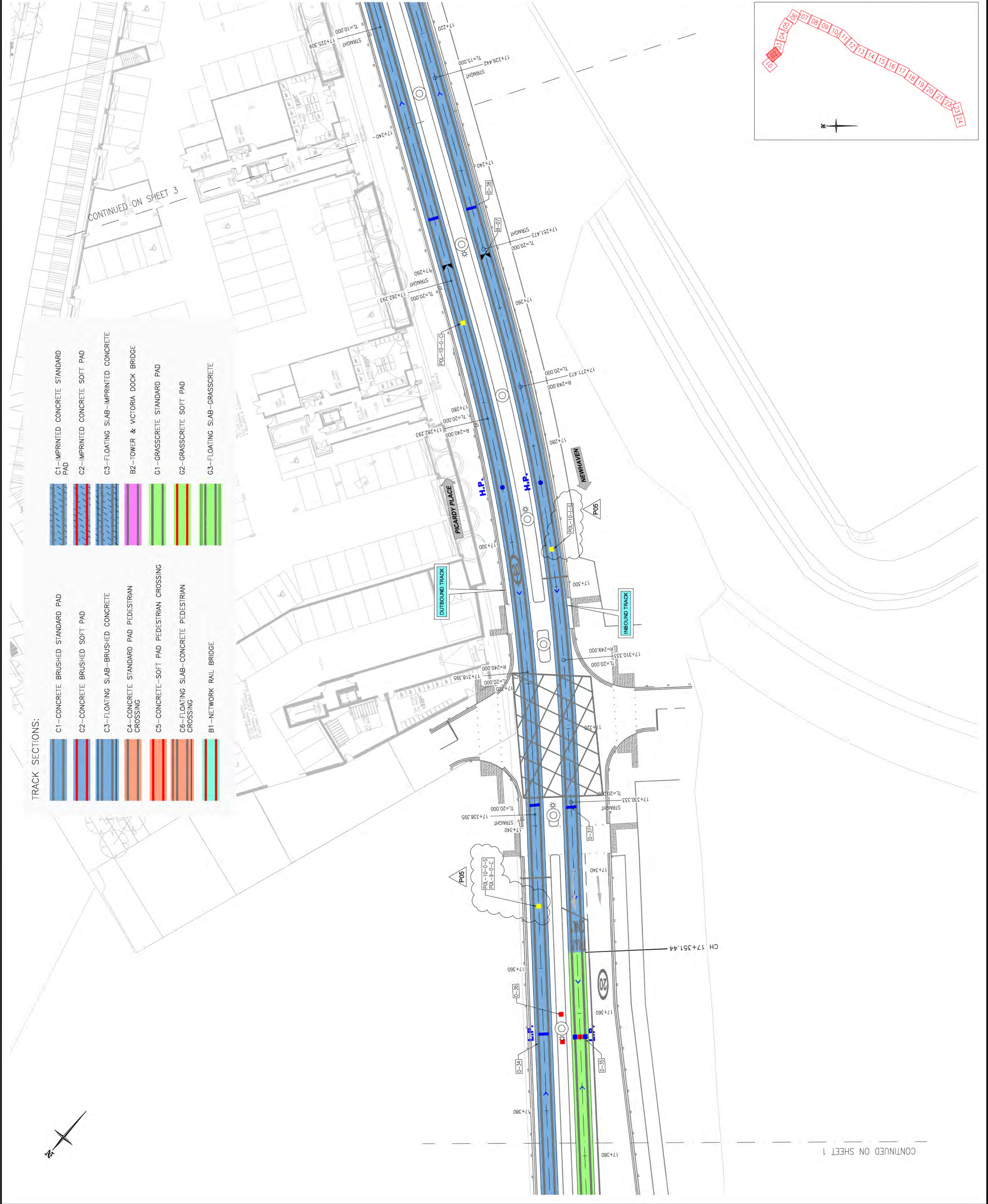
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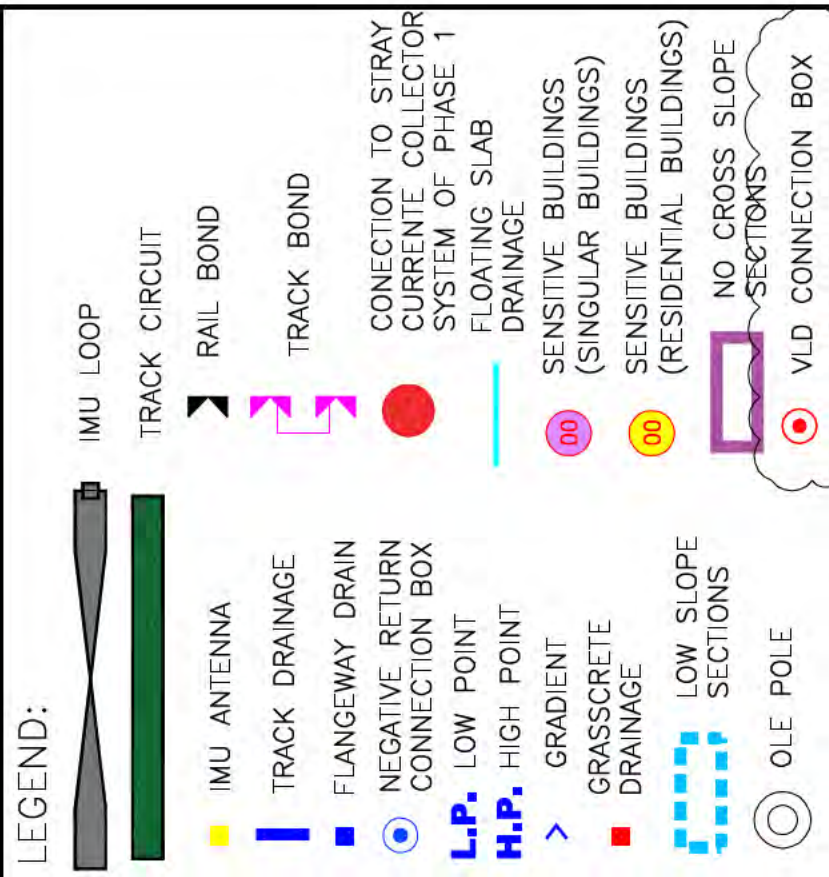
EDINBURGH TRAM
YORK PLACE TO NEWHAVEN
TRACKWORKS

SECTION YORK PLACE – OCEAN TERMINAL
TRACKWORKS LAYOUT

Sheet 2 of 24

FOR COMMENTS AND REVIEW									
Status:		1:250							
Scale of A1:		1:250							
Drawn:	UPL	Checked:	AFLL	Approved:	LOB				
Date:	18/11/2020	Date:	18/11/2020	Date:	18/11/2020				
Project:	Originator	Volume	Location	Type	Role	Number			
ETYN-SEF-XXX-12-DR-H-2501									
Submitted:	Revision:								
S3	P05								





NOTE:
1- FOR CONNECTION DETAILS OF RAIL BONDS, SEE DRAWING: P05.
2- ETYN-SEF-XXX-DR-Z-001 (OLE BRACKS)
3- VLD CONNECTION BOXES ARE TO BE PLACED ACCORDING TO THE FINAL LOCATION OF VLD PRESENTED IN DRAWINGS.
4- ETYN-SEF-18X-15-DR-Z-0201 TO ETYN-SEF-18X-15-DR-Z-0239.
5- PEDESTRIAN CROSSINGS SHALL BE FINISHED WITH BRUSHED CONCRETE.

SAFETY HEALTH AND ENVIRONMENTAL INFORMATION

IN ADDITION TO THE HAZARD/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING RISK AND INFORMATION.

IDENTIFIED RISK ARE NOTE IN ETYN-SEF-XXX-XX-HS-Z-001.
RISK REGISTER, REFER TO RISK REGISTER FOR MITIGATION MEASURES.
RISKS ASSOCIATE WITH THIS WORKS ELEMENT ARE AS FOLLOWS

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FOR INFORMATION RELATING TO USE, CLEANING AND MAINTENANCE SEE THE HEALTH AND SAFETY FILE.

IT IS ASSUMED THAT ALL WORKS WILL BE CARRIED OUT BY A COMPETENT CONTRACTOR WORKING, WHERE APPROPRIATE, TO AN APPROVED METHOD STATEMENT.

Rev.	Date	Description	Drawn	Checked	Approved
P05	18/11/2020	MDU COMMENTS INCLUDED	UPL	AFLL	LOB
P04	18/11/2020	MDU COMMENTS INCLUDED	UPL	AFLL	LOB
P01	18/11/2020	FIRST ISSUE	UPL	AFLL	LOB



Project Title:

EDINBURGH TRAM
YORK PLACE TO NEWHAVEN
TRACKWORKS

Drawing Title:

SECTION YORK PLACE – OCEAN TERMINAL
TRACKWORKS LAYOUT

Sheet 3 of 24

FOR COMMENTS AND REVIEW				
Status:	1:250			
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Drawn:	UPL	Checked:	AFLL	Approved:
				LOB
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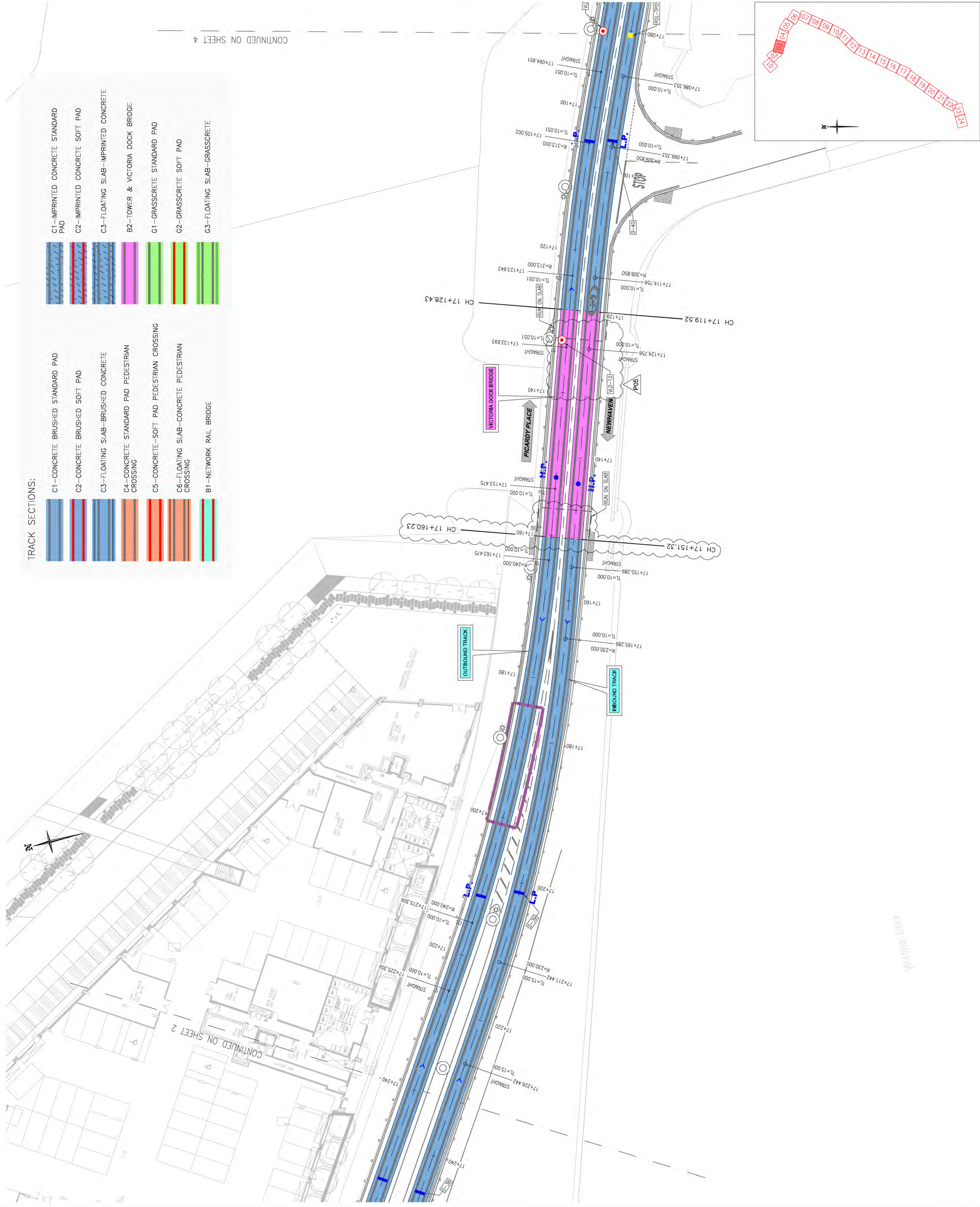
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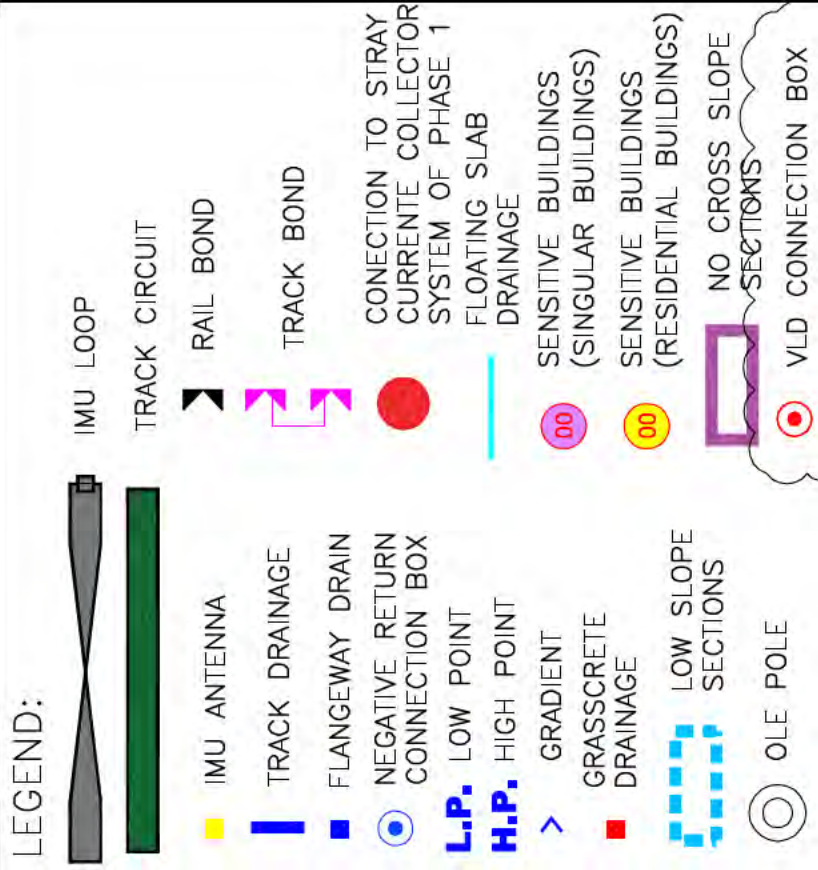
P05

TRACK SECTIONS:

- C1 – CONCRETE BRUSHED STANDARD PAD
- C2 – CONCRETE BRUSHED SOFT PAD
- C3 – FLOATING SLAB-BRUSHED CONCRETE
- C4 – CONCRETE STANDARD PAD PEDESTRIAN CROSSING
- C5 – CONCRETE-SOFT PAD PEDESTRIAN CROSSING
- C6 – FLOATING SLAB-CONCRETE PEDESTRIAN CROSSING
- B1 – NETWORK RAIL BRIDGE

- C1 – IMPRINTED CONCRETE STANDARD PAD
- C2 – IMPRINTED CONCRETE SOFT PAD
- C3 – FLOATING SLAB-IMPRINTED CONCRETE
- B2 – TOWER & VICTORIA DOCK BRIDGE
- G1 – GRASSCRETE STANDARD PAD
- G2 – GRASSCRETE SOFT PAD
- G3 – FLOATING SLAB-GRASSCRETE





NOTE:
1. FOR CONNECTION DETAILS OF RAIL BONDS, SEE DRAWING: P05.
2. ETVN-SEF-XXX-DR-Z-020 (OLE BRACK)
3. VLD CONNECTION BOXES ARE TO BE PLACED, ACCORDING TO THE FINAL LOCATION OF VLD PRESENTED IN DRAWINGS.
4. ETVN-SEF-18X-15-DR-Z-0201 TO ETVN-SEF-18X-15-DR-Z-0239.
5. PEDESTRIAN CROSSINGS SHALL BE FINISHED WITH BRUSHED CONCRETE.

SAFETY HEALTH AND ENVIRONMENTAL INFORMATION

IN ADDITION TO THE HAZARD/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING RISK AND INFORMATION.

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RISK REGISTER, REFER TO RISK REGISTER FOR MITIGATION MEASURES.
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FOR INFORMATION RELATING TO USE, CLEANING AND MAINTENANCE SEE THE HEALTH AND SAFETY FILE.

IT IS ASSUMED THAT ALL WORKS WILL BE CARRIED OUT BY A COMPETENT CONTRACTOR WORKING, WHERE APPROPRIATE, TO AN APPROVED METHOD STATEMENT.

Rev.	Date	Description	Drawn	Checked	Approved
P05	18/11/2020	MDU COMMENTS INCLUDED	UPL	ATFL	LOB
P04	18/11/2020	MDU COMMENTS INCLUDED	UPL	ATFL	LOB
P01	18/11/2020	FIRST ISSUE	UPL	EG	LOB



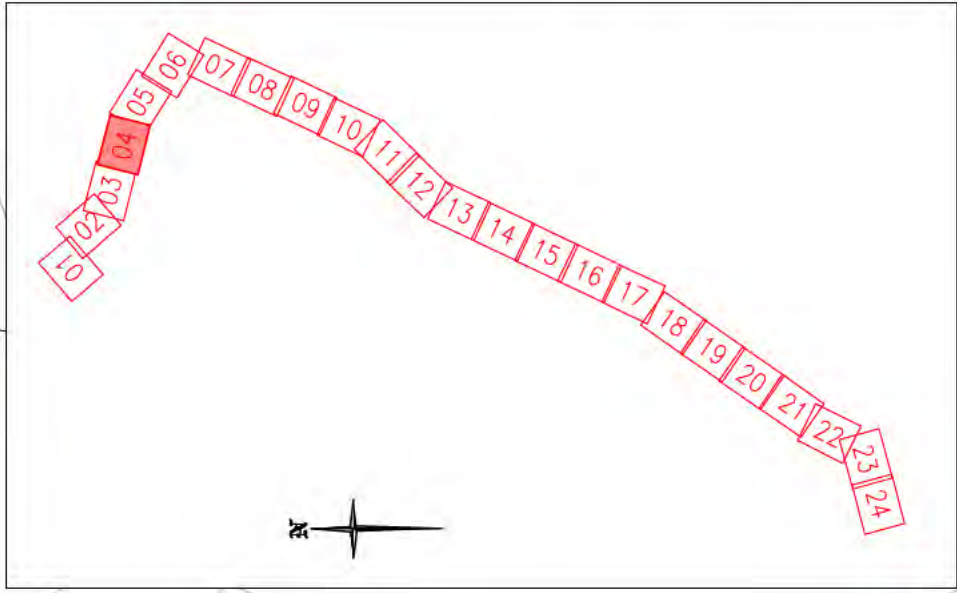
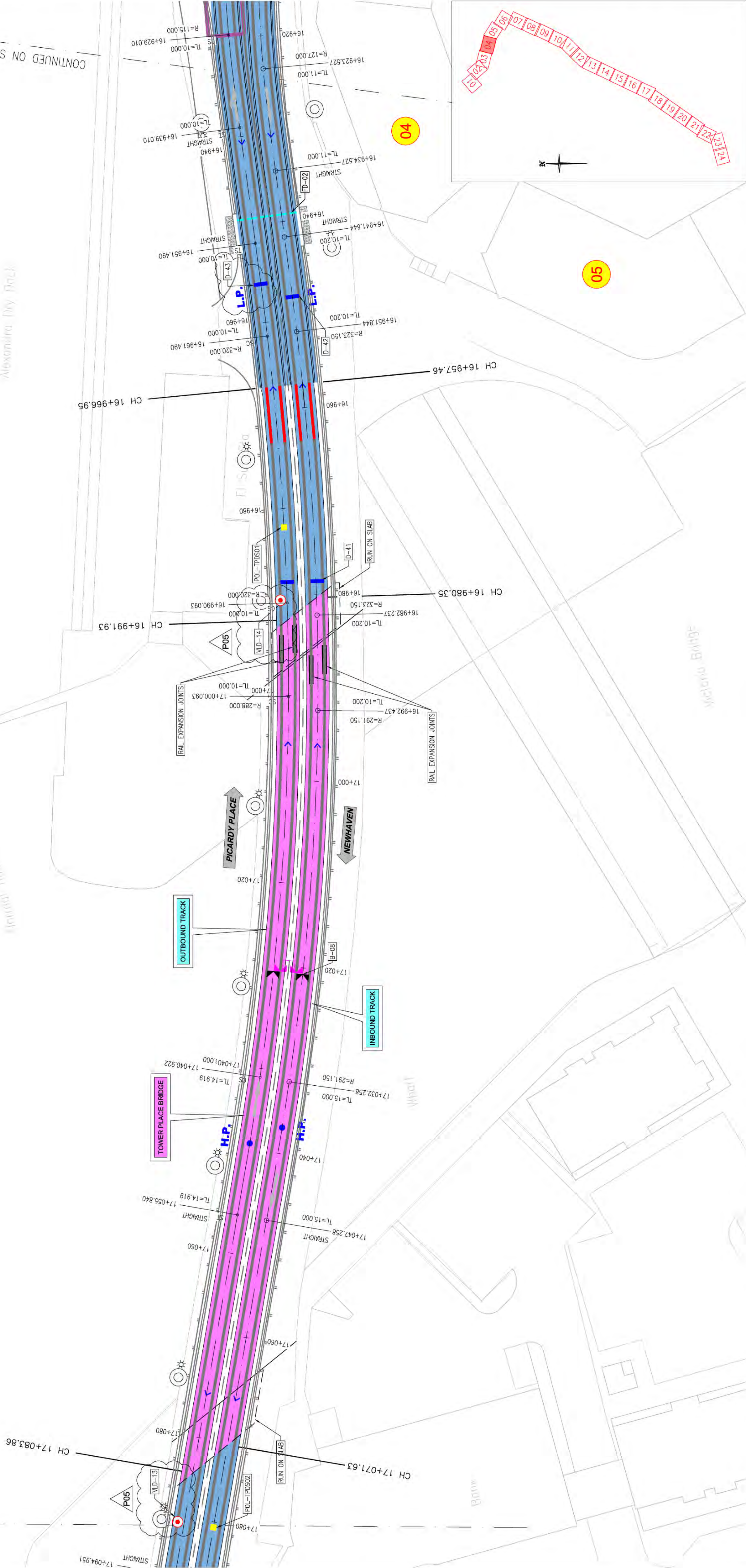
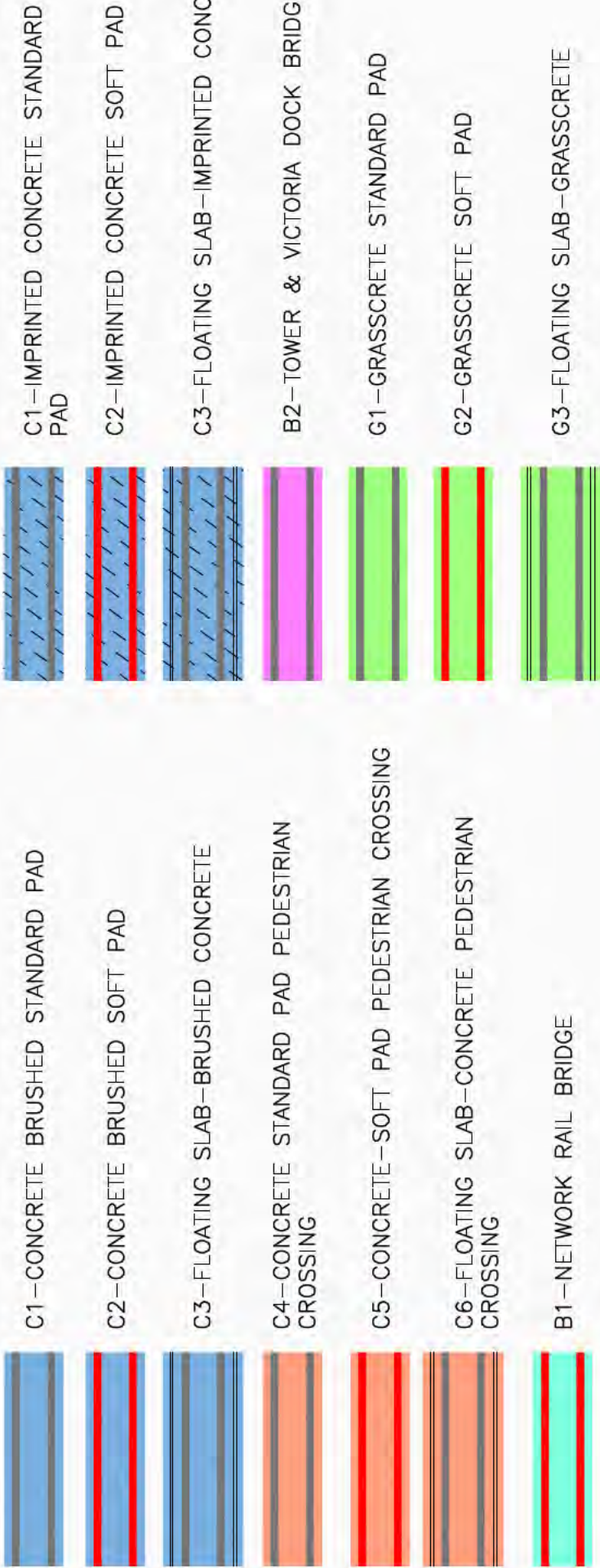
EDINBURGH TRAM
YORK PLACE TO NEWHAVEN
TRACKWORKS

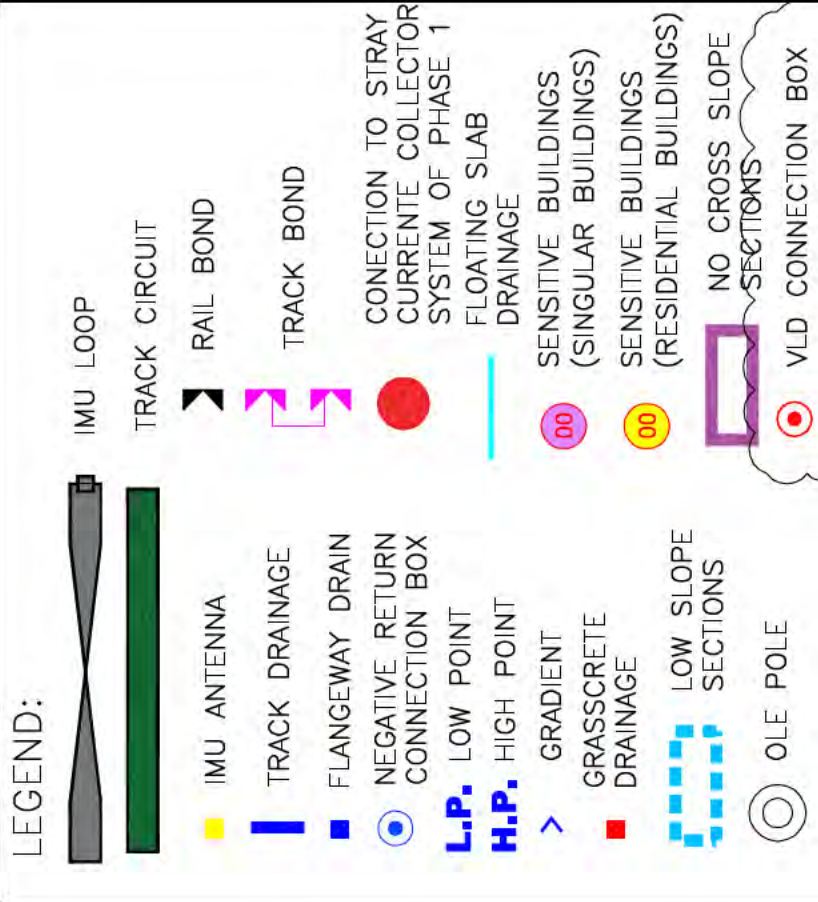
SECTION YORK PLACE – OCEAN TERMINAL
TRACKWORKS LAYOUT

Sheet 4 of 24

FOR COMMENTS AND REVIEW									
Scale of A1:		Status:							
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		Approved:						LOB	
Date:		18/11/2020		Date:		18/11/2020		Date:	
Project:		Originator		Volume		Location		Type	
								Role	
ETVN-SEF-XXX-12-DR-H-2503									
Submitted:		Revision:							
S3		P05							

TRACK SECTIONS:





NOTE:
1. FOR CONNECTION DETAILS OF RAIL BONDS, SEE DRAWING: P08.
2. ETYN-SEF-XXX-DR-Z-000 (OLE BRACKS)
3. VLD CONNECTION BOXES ARE TO BE PLACED, ACCORDING TO THE FINAL LOCATION OF VLD PRESENTED IN DRAWINGS.
4. ETYN-SEF-18X-15-DR-Z-0201 TO ETYN-SEF-18X-15-DR-Z-0239.
5. PEDESTRIAN CROSSINGS SHALL BE FINISHED WITH BRUSHED CONCRETE.

SAFETY HEALTH AND ENVIRONMENTAL INFORMATION

IN ADDITION TO THE HAZARD/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING RISK AND INFORMATION.

IDENTIFIED RISK ARE NOTE IN ETYN-SEF-XXX-XX-HS-Z-001.
RISK REGISTER, REFER TO RISK REGISTER FOR MITIGATION MEASURES.
RISKS ASSOCIATE WITH THIS WORKS ELEMENT ARE AS FOLLOWS

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FOR INFORMATION RELATING TO USE, CLEANING AND MAINTENANCE SEE THE HEALTH AND SAFETY FILE.

IT IS ASSUMED THAT ALL WORKS WILL BE CARRIED OUT BY A COMPETENT CONTRACTOR WORKING, WHERE APPROPRIATE, TO AN APPROVED METHOD STATEMENT.

Rev.	Date	Description	Drawn	Checked	Revised
P06	18/11/2020	MDU COMMENTS INCLUDED	UPL	AFLL	LOB
P05	18/11/2020	MDU COMMENTS INCLUDED	UPL	AFLL	LOB
P01	18/11/2020	FIRST ISSUE	UPL	AFLL	LOB

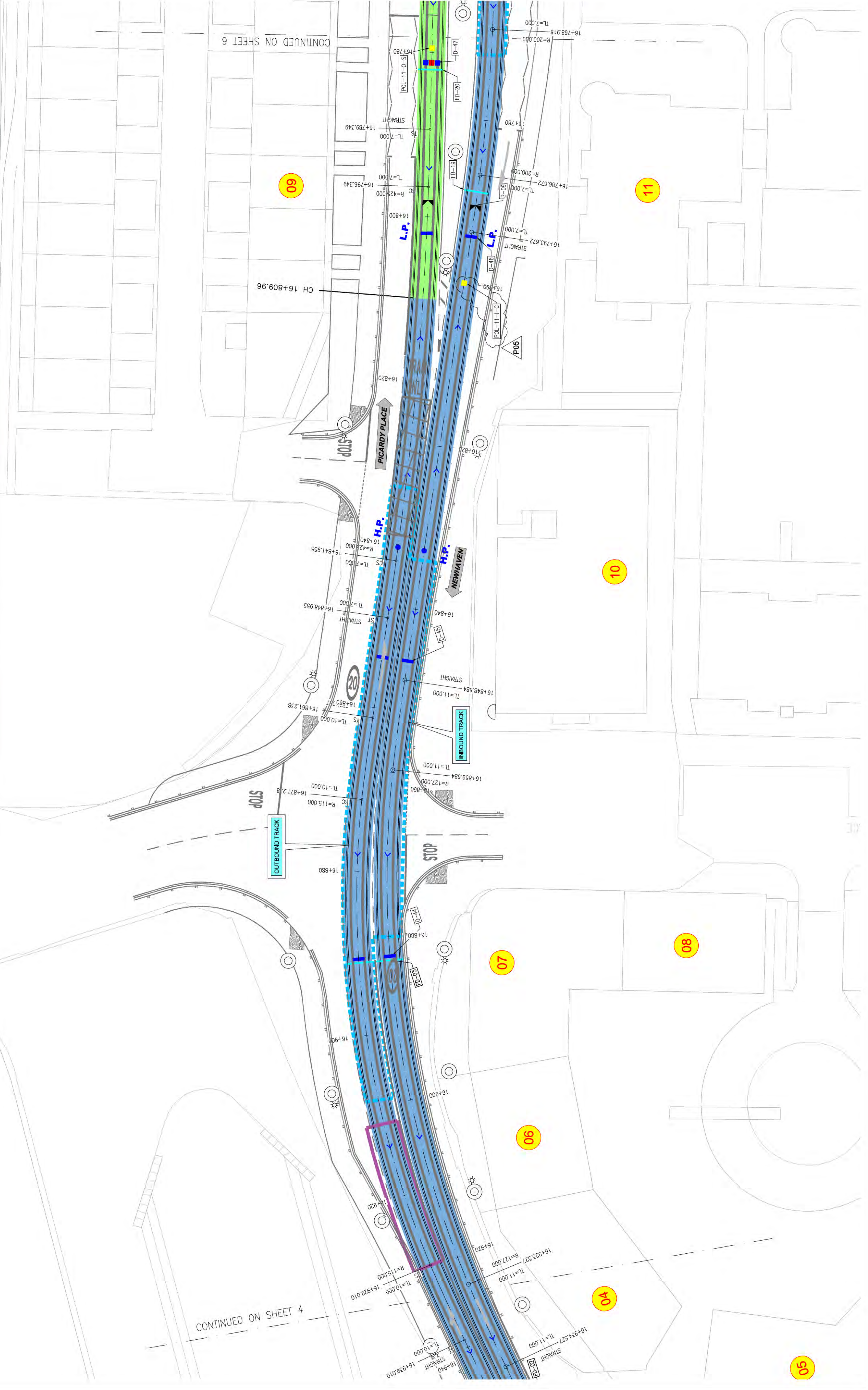
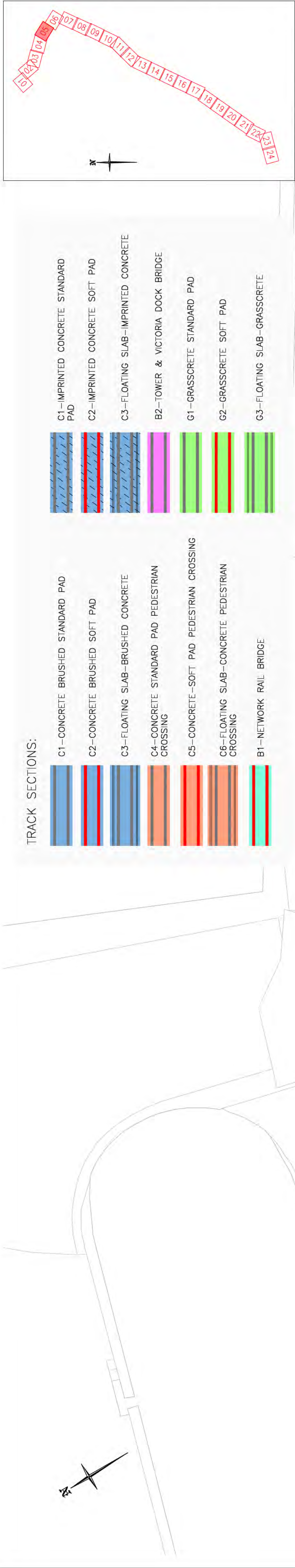


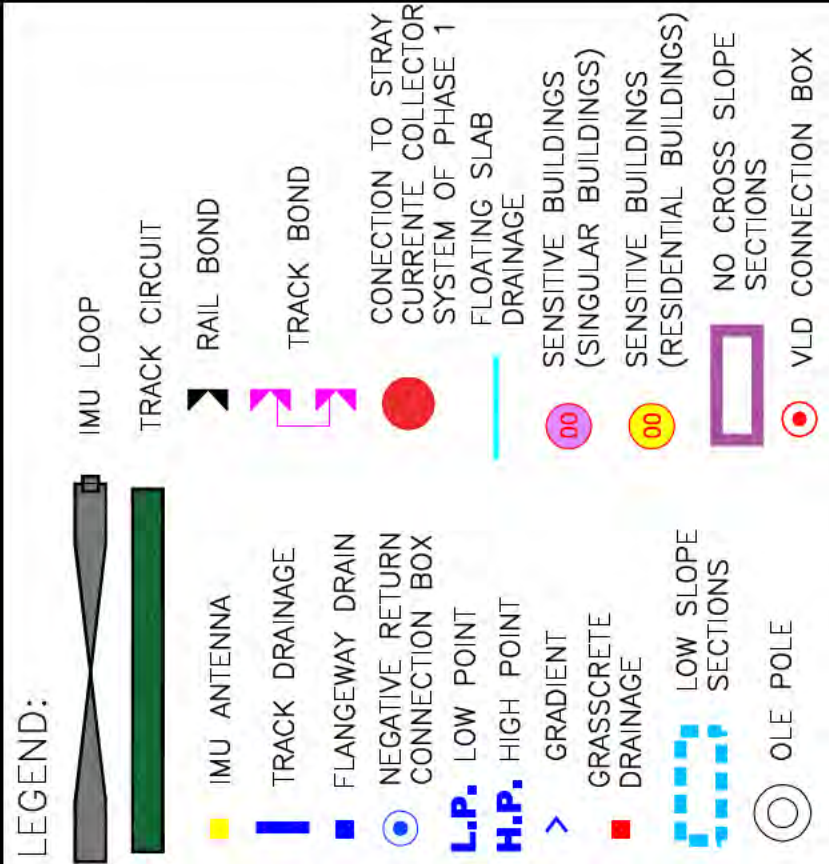
EDINBURGH TRAM
YORK PLACE TO NEWHAVEN
TRACKWORKS

SECTION YORK PLACE – OCEAN TERMINAL
TRACKWORKS LAYOUT

Sheet 5 of 24

Scale of A3:	1:250	Status:	FOR COMMENTS AND REVIEW
Drawn:	UPL	Checked:	AFLL
Date:	18/11/2020	Approved:	LOB
Date:	18/11/2020	Date:	18/11/2020
Project:	Originator	Volume	Location
ETYN-SEF-XXX-12-DR-H-2504	Type	Role	Number
Submittal:			
S3			P06





NOTE: FOR CONNECTION DETAILS OF RAIL BONDS, SEE DRAWING: ETVN-SEF-XXX-DR-Z-020 (OLE BRIDGE).
2. VLD CONNECTION BOXES ARE TO BE PLACED ACCORDING TO THE FINAL LOCATION OF VLD PRESENTED IN DRAWINGS.
ETVN-SEF-18X-15-DR-Z-0201, TO ETVN-SEF-18X-15-DR-Z-0239.
3- PEDESTRIAN CROSSINGS SHALL BE FINISHED WITH BRUSHED CONCRETE.

SAFETY HEALTH AND ENVIRONMENTAL INFORMATION

IN ADDITION TO THE HAZARD/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING RISK AND INFORMATION.

IDENTIFIED RISK ARE NOTE IN ETVN-SEF-XXX-XX-HS-Z-001.
RISK REGISTER, REFER TO RISK REGISTER FOR MITIGATION MEASURES.
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FOR INFORMATION RELATING TO USE, CLEANING AND MAINTENANCE SEE THE HEALTH AND SAFETY FILE.

IT IS ASSUMED THAT ALL WORKS WILL BE CARRIED OUT BY A COMPETENT CONTRACTOR WORKING, WHERE APPROPRIATE, TO AN APPROVED METHOD STATEMENT.

Rev.	Date	Description	Drawn	Checked	Approved
P08	14/01/2021	MDU COMMENTS INCLUDED	UPL	ATFL	LOB
P07	14/01/2021	MDU COMMENTS INCLUDED	UPL	ATFL	LOB
P01	14/01/2021	FIRST ISSUE	UPL	IEG	LOB



Project Title:

EDINBURGH TRAM
YORK PLACE TO NEWHAVEN
TRACKWORKS

SECTION YORK PLACE – OCEAN TERMINAL
TRACKWORKS LAYOUT

Sheet 6 of 24

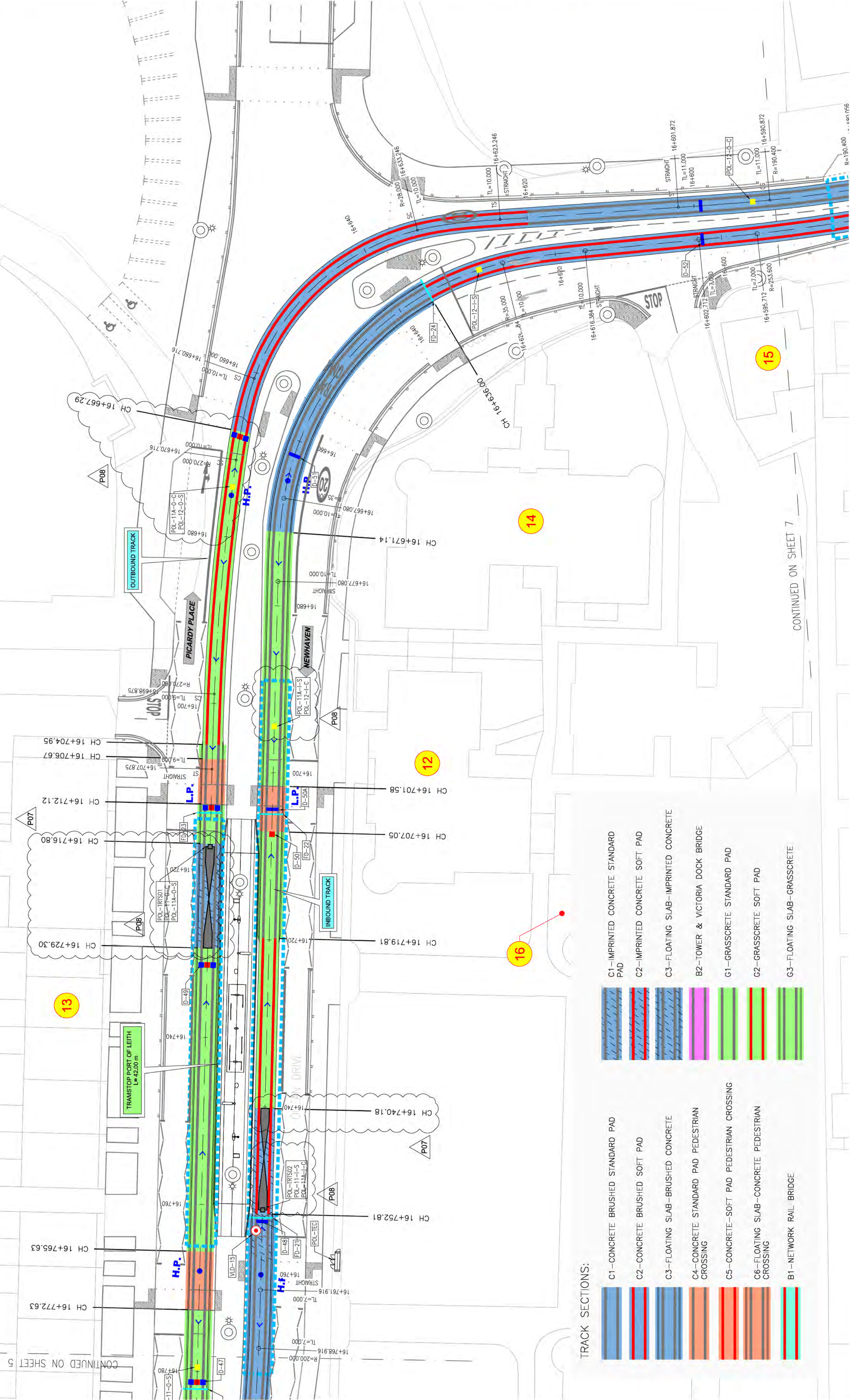
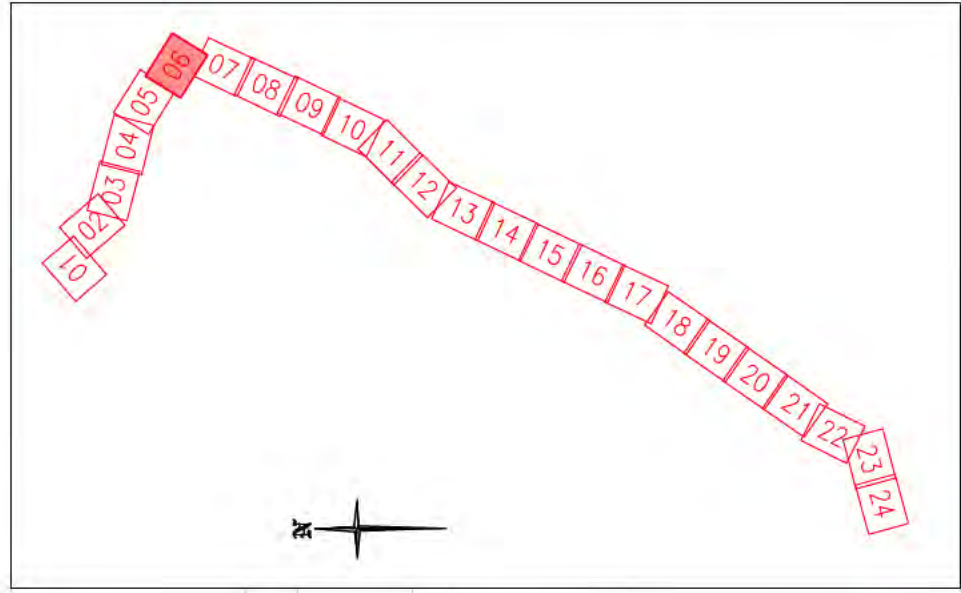
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Date: 26/01/2021	Date: 26/01/2021
Project Originator	Volume Location Type Role Number

ETVN-SEF-XXX-12-DR-H-2505

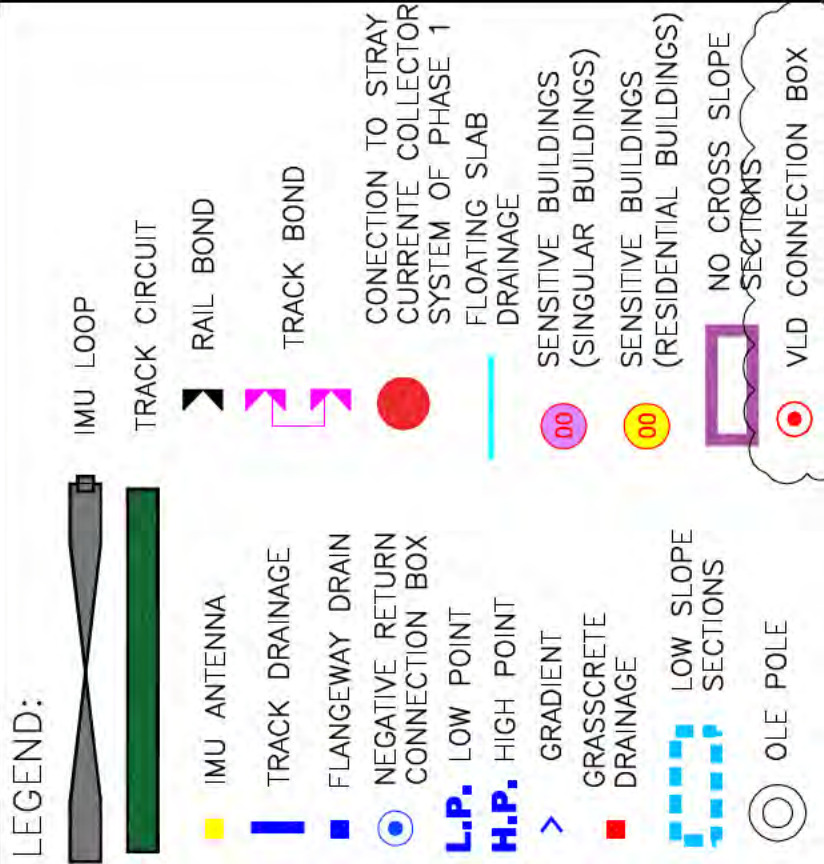
Submittal:

S3

P08



CONTINUED ON SHEET 7



NOTE:
1- FOR CONNECTION DETAILS OF RAIL BONDS, SEE DRAWING: /P05
2- ETYN-SEF-XXX-DR-Z-020 (OLE BRACK)
3- VLD CONNECTION BOXES ARE TO BE PLACED, ACCORDING TO THE FINAL LOCATION OF VLD PRESENTED IN DRAWINGS
4- ETYN-SEF-18X-15-DR-Z-0201 TO ETYN-SEF-18X-15-DR-Z-0239
5- PEDESTRIAN CROSSINGS SHALL BE FINISHED WITH BRUSHED CONCRETE.

SAFETY HEALTH AND ENVIRONMENTAL INFORMATION

IN ADDITION TO THE HAZARD/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING RISK AND INFORMATION.

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- 141 DRAINAGE FAILURE LEADING TO ACCIDENTS

FOR INFORMATION RELATING TO USE, CLEANING AND MAINTENANCE SEE THE HEALTH AND SAFETY FILE.

IT IS ASSUMED THAT ALL WORKS WILL BE CARRIED OUT BY A COMPETENT CONTRACTOR WORKING, WHERE APPROPRIATE, TO AN APPROVED METHOD STATEMENT.

Rev.	Date	Description	Drawn	Checked	Revised
P05	18/11/2020	MDU COMMENTS INCLUDED	UPL	AFLL	LOB
P04	18/11/2020	MDU COMMENTS INCLUDED	UPL	AFLL	LOB
P01	18/11/2020	FIRST ISSUE	UPL	AFLL	LOB



Project Title:
**EDINBURGH TRAM
YORK PLACE TO NEWHAVEN
TRACKWORKS**

Section Title:
**SECTION YORK PLACE – OCEAN TERMINAL
TRACKWORKS LAYOUT**

Sheet 7 of 24

Status	FOR COMMENTS AND REVIEW
Scale of A3: 1:250	Drawn: UPL
Drawn: UPL	Checked: AFLL
Date: 18/11/2020	Approved: LOB
Date: 18/11/2020	Date: 18/11/2020
Project Originator	Volume Location Type Role Number
ETYN-SEF-XXX-12-DR-H-2506	
Submitted:	Reason:

S3

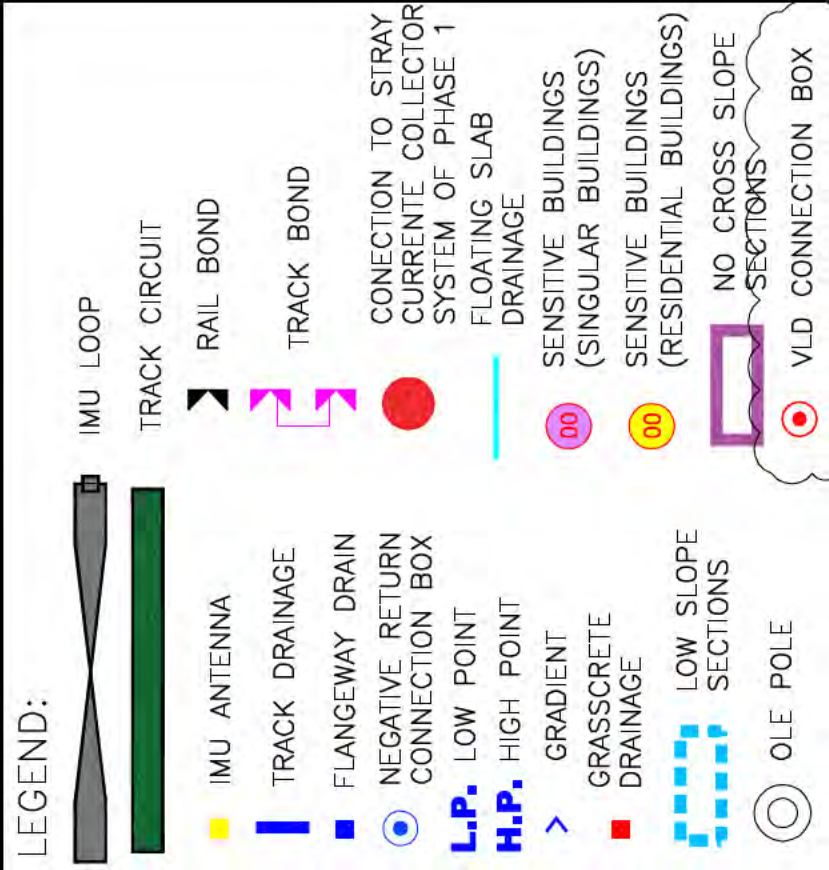
P05

TRACK SECTIONS:

- C1-CONCRETE BRUSHED STANDARD PAD
- C2-CONCRETE BRUSHED SOFT PAD
- C3-FLOATING SLAB-BRUSHED CONCRETE
- C4-CONCRETE STANDARD PAD PEDESTRIAN CROSSING
- C5-CONCRETE-SOFT PAD PEDESTRIAN CROSSING
- C6-FLOATING SLAB-CONCRETE PEDESTRIAN CROSSING
- B1-NETWORK RAIL BRIDGE
- C1-IMPRINTED CONCRETE STANDARD PAD
- C2-IMPRINTED CONCRETE SOFT PAD
- C3-FLOATING SLAB-IMPRINTED CONCRETE
- B2-TOWER & VICTORIA DOCK BRIDGE
- G1-GRASSCRETE STANDARD PAD
- G2-GRASSCRETE SOFT PAD
- G3-FLOATING SLAB-GRASSCRETE

CONTINUED ON SHEET 8

CONTINUED ON SHEET 6



NOTES:
1. FOR CONNECTION DETAILS OF RAIL BONDS, SEE DRAWING: /P05/
2. EYTN-SEF-XXX-DR-Z-001 (OLE BRACKS)
3. VLD CONNECTION BOXES ARE TO BE PLACED ACCORDING TO THE FINAL LOCATION OF VLD PRESENTED IN DRAWINGS
EYTN-SEF-18X-15-DR-Z-0201 TO EYTN-SEF-18X-15-DR-Z-0239.
3- PEDESTRIAN CROSSINGS SHALL BE FINISHED WITH BRUSHED CONCRETE.

SAFETY HEALTH AND ENVIRONMENTAL INFORMATION
IN ADDITION TO THE HAZARD/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING RISK AND INFORMATION.

IDENTIFIED RISK ARE NOTE IN EYTN-SEF-XXX-XX-HS-Z-001.
RISK REGISTER, REFER TO RISK REGISTER FOR MITIGATION MEASURES.
RISKS ASSOCIATE WITH THIS WORKS ELEMENT ARE AS FOLLOWS

REF: N/A

- 35 SI EXISTING GROUND
76 SLAB OVER 275KV CABLES
82 RESTRICTED DEPTH (TOWER PLACE BRIDGE)
84 TRACKWORKS LOSS OF RAIL BONDING
100A TRACKWORKS LOSS OF RAIL BONDING
100B TRACKWORKS LOSS OF RAIL BONDING
102A TRACKWORKS CONCRETE DEGRADATION
102B TRACKWORKS CONCRETE CRACKS
103A TRACKWORKS ROLLING STOCK INTERFACE
104 SPEN 275KV
114 FREEZING LEADING TO ACCIDENTS
139 FLOATING SLAB FAILURE
140 DRAINAGE FAILURE LEADING TO ACCIDENTS

FOR INFORMATION RELATING TO USE, CLEANING AND MAINTENANCE SEE THE HEALTH AND SAFETY FILE.

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Rev.	Date	Description	Drawn	Checked	Approved
P05	18/11/2020	MDU COMMENTS INCLUDED	UPL	AFL	LOB
P04	18/11/2020	MDU COMMENTS INCLUDED	UPL	AFL	LOB
P01	18/11/2020	FIRST ISSUE	UPL	IEG	LOB



Project Title:
**EDINBURGH TRAM
YORK PLACE TO NEWHAVEN
TRACKWORKS**

Section Title:
**SECTION YORK PLACE – OCEAN TERMINAL
TRACKWORKS LAYOUT**

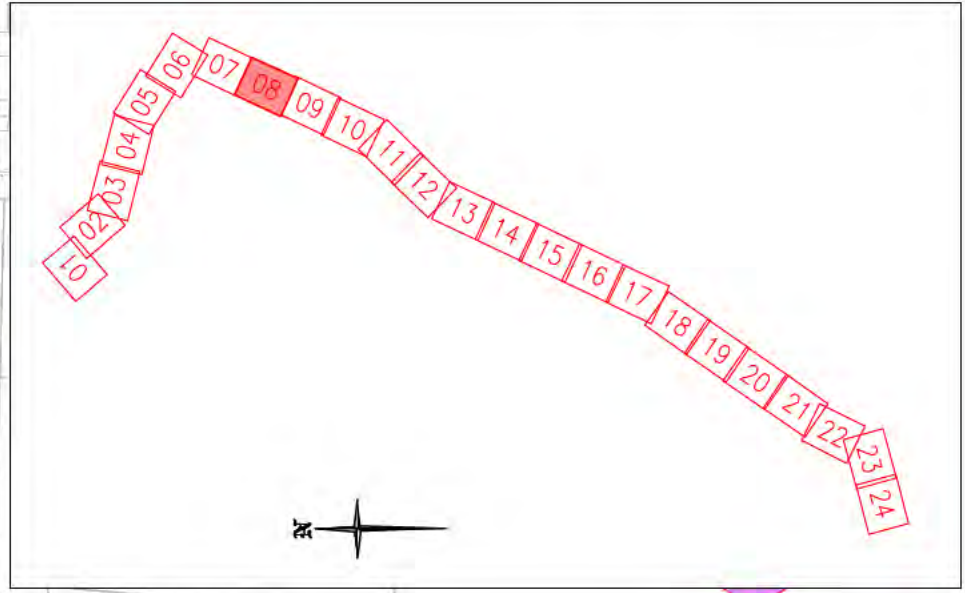
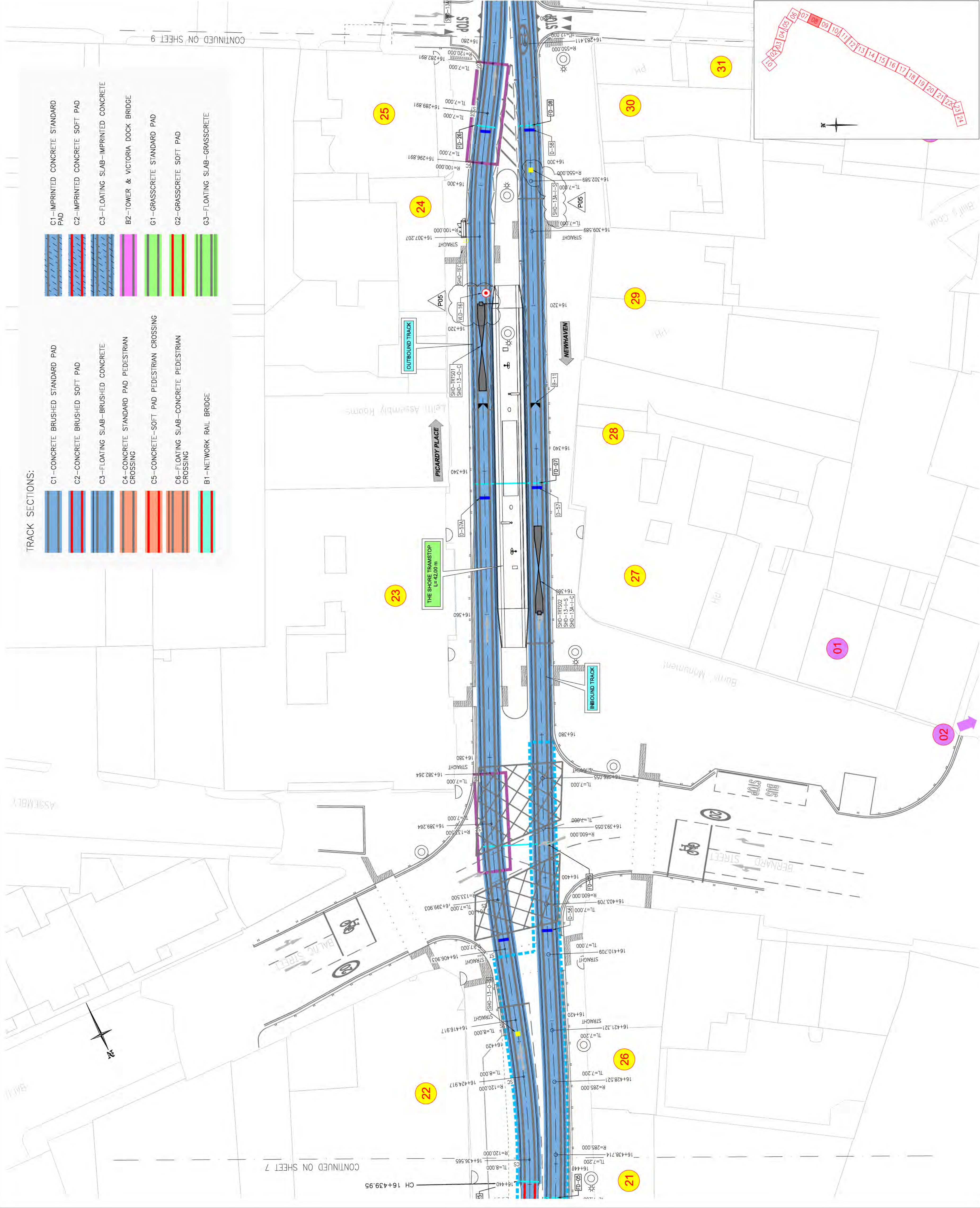
Sheet 8 of 24

FOR COMMENTS AND REVIEW									
Scale of A1:		Status:							
1:250									
Drawn:	UPL	Checked:	AITL	Approved:	LOB				
Date:	18/11/2020	Date:	18/11/2020	Date:	18/11/2020				
Project:	Originator	Volume	Location	Type	Role	Number			
EYTN-SEF-XXX-12-DR-H-2507									
Submitter:	Revision:								
S3	P05								

TRACK SECTIONS:

- C1-CONCRETE BRUSHED STANDARD PAD
C2-CONCRETE BRUSHED SOFT PAD
C3-FLOATING SLAB-BRUSHED CONCRETE
C4-CONCRETE STANDARD PAD PEDESTRIAN CROSSING
C5-CONCRETE-SOFT PAD PEDESTRIAN CROSSING
C6-FLOATING SLAB-CONCRETE PEDESTRIAN CROSSING
B1-NETWORK RAIL BRIDGE

- C1-IMPRINTED CONCRETE STANDARD PAD
C2-IMPRINTED CONCRETE SOFT PAD
C3-FLOATING SLAB-IMPRINTED CONCRETE
B2-TOWER & VICTORIA DOCK BRIDGE
G1-GRASSCRETE STANDARD PAD
G2-GRASSCRETE SOFT PAD
G3-FLOATING SLAB-GRASSCRETE





NOTE:

SAFETY HEALTH AND ENVIRONMENTAL INFORMATION

IN ADDITION TO THE HAZARD/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING RISK AND INFORMATION:

IDENTIFIED RISK ARE NOTE IN ETYN-SEF-XXX-XX-HS-Z-001.
RISK REGISTER, REFER TO RISK REGISTER FOR MITIGATION MEASURES.
RISKS ASSOCIATE WITH THIS WORKS ELEMENT ARE AS FOLLOWS

REF. NAME

35 SI EX

FOR INFORMATION RELATING TO USE, CLEANING AND MAINTENANCE SEE THE HEALTH AND SAFETY FILE.

IT IS ASSUMED THAT ALL WORKS WILL BE CARRIED OUT BY A COMPETENT CONTRACTOR WORKING, WHERE APPROPRIATE, TO AN APPROVED METHOD STATEMENT.

Rev.	Date	Description	Drawn	Checked	Approved
P07	11/2/2020	MDU COMMENTS INCLUDED	UPL	AFLL	LQB
P06	9/1/2020	MDU COMMENTS INCLUDED	UPL	AFLL	LQB
P01	7/19/2020	FIRST ISSUE	UPL	IFG	LQB



Project Title:

EDINBURGH TRAM

SECTION YORK PLACE - OCEAN TERMINAL TRACKWORKS LAYOUT

Sheet 9 of 24

Status: 1:250		FOR COMMENTS AND REVIEW	
Location at At:	UPL	ATLL	LOB
Checked:			
Approved:			
Date:	14/12/2020	Date:	14/12/2020
Project	Originator	Volume	Location
ETYN-SEF-XXX-12-DR-H-2508			
Submitted:			Revision:

S3 P07

