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CABINET- SUPPLEMENT PACK

Monday 19 February 2024
2.00 pm
Council House, Plymouth

Members:
Councillor Evans OBE, Chair
Councillor Laing, Vice Chair
Councillors Aspinall, Briars-Delve, Coker, Cresswell, Dann, Haydon, Lowry and Penberthy.

Members are invited to attend the above meeting to consider the items of business overleaf.

This meeting will be webcast and available on-line after the meeting. By entering the Warspite room councillors are consenting to being filmed during the meeting and to the use of the recording for the webcast.

The Council is a data controller under the Data Protection Act. Data collected during this webcast will be retained in accordance with authority's published policy.

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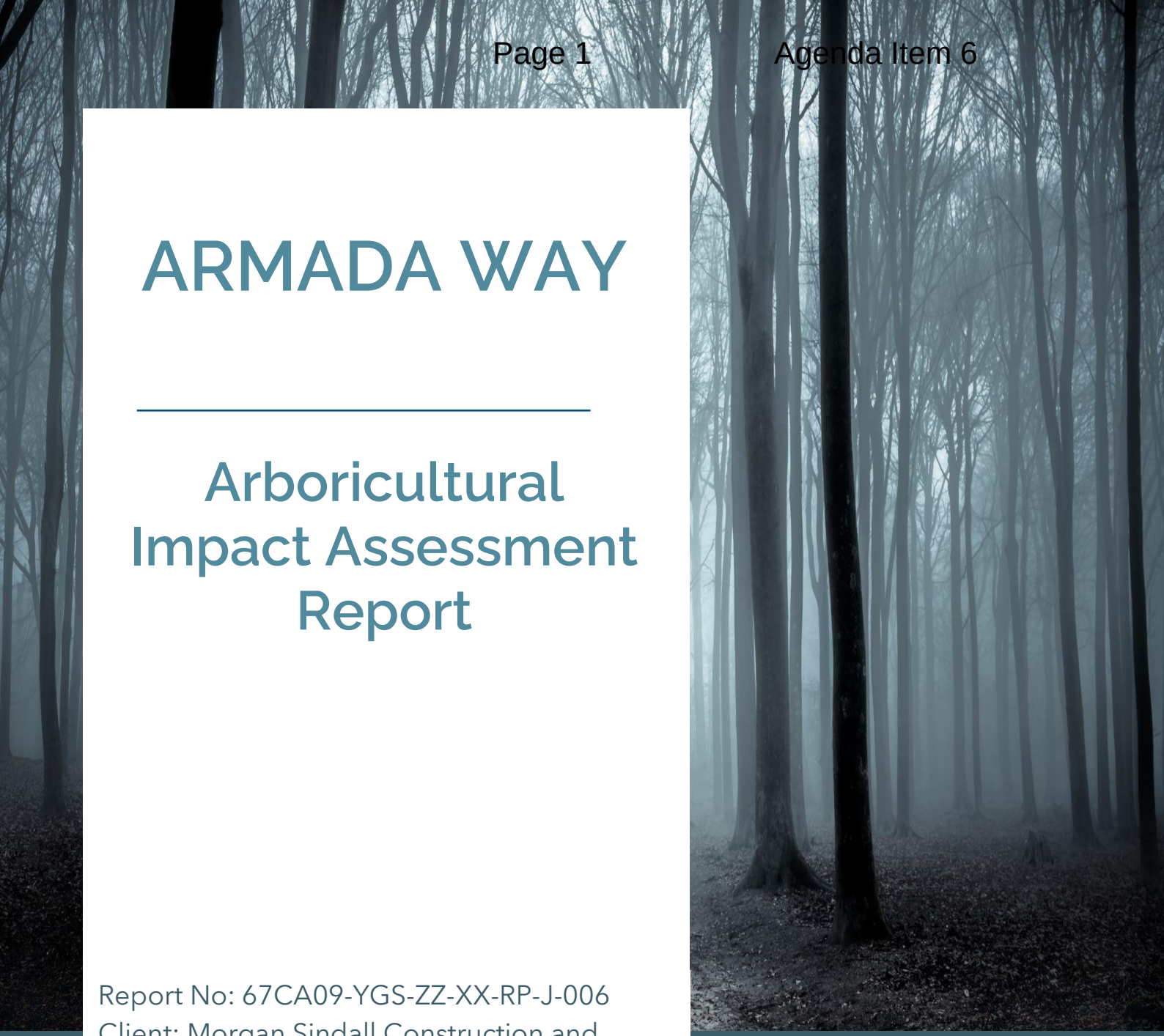
Tracey Lee
Chief Executive

Cabinet

6. Better Places Programme: Armada Way: (Pages 1 - 62)



ARMADA WAY

Arboricultural Impact Assessment Report

Report No: 67CA09-YGS-ZZ-XX-RP-J-006
Client: Morgan Sindall Construction and Infrastructure Ltd
Date: November 2022

YGS ENVIRONMENTAL CONSULTANTS

Prepared For:

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Issue Schedule

Issue No	Date	Comments	By	Verified	Approved
P01	03/11/2022	NA	Gregory Adamson, Dip Arb L6 (ABC), MArborA.	Adam King, BA(Hons), MA, CMLI, Cert Arb.	Adam King, BA(Hons), MA, CMLI, Cert Arb.
P02	28/02/2023	Design update.	Gregory Adamson, Dip Arb L6 (ABC), MArborA.	Adam King, BA(Hons), MA, CMLI, Cert Arb.	Adam King, BA(Hons), MA, CMLI, Cert Arb.
P03	17/02/2024	Interim Draft Update Report	Adam King, BA(Hons), MA, CMLI, Cert Arb.		

1 Introduction

1.1 Instructions

1.1.1 YGS Environmental Consultants Ltd (YGS) has been instructed by Morgan Sindall Construction and Infrastructure Ltd (the 'Client') with regards to the redevelopment of Armada Way, Plymouth City Centre (herein referred to as 'the Site').

1.1.2 The production of an Arboricultural Impact Assessment (AIA) is requested in accordance with *BS5837:2012 Trees in Relation to design, demolition and construction – recommendations*. This AIA is an interim draft document to indicate the main changes between the current scheme and the previous scheme and will be updated during the Stage 5 development of the scheme.

1.1.3 In addition, an evaluation of the Site's tree population has been included.

1.1.4 The following documents were provided:

Document Name	Reference Number	Date Received
ARMADA WAY PROPOSED GA MASTERPLAN ALL ZONES	67CA09-STA-ZZ-XX-DR-L-30-001 –REV P04	12th February 2024
ARMADA WAY Tree Translocation Assessment	Tree Translocation Assessment P04	16th November 2023

Table 1. Received documents.

1.2 Background

1.2.1 This report assesses the direct and indirect impacts of the Proposed Development to existing trees on Site and vice versa. Where necessary, suitable mitigation is proposed for identified impacts.

1.3 Trees and the Planning Process

1.3.1 The National Planning Policy Framework (NPPF) seeks to ensure that new development is sustainable and underlines the importance of Green Infrastructure, of which trees form an integral part. This encompasses a recognition of the importance of trees in relation to the management of air, soil and water quality along with other associated ecosystem services and climate change adaption. The NPPF also seeks to achieve the protection and enhancement of landscapes and a net gain in biodiversity.

1.4 Local Policy Context

1.4.1 Plymouth City Council has a statutory duty to consider trees when granting planning permission. The following excerpts are extracted from The Plymouth and South West Devon Joint Local Plan (2014-2034)[1] and The Plymouth Plan 2013-2034[2], which demonstrate the importance of tree retention, protection and where this is not feasible, mitigation for tree loss.

1.4.2 Policy DEV28 of The Plymouth and South West Devon Joint Local Plan recognises the value of trees and states *"Development should be designed so as to avoid the loss or deterioration of woodlands, trees or hedgerows. If*

[1] https://westdevon.gov.uk/jointlocalplan
[2] https://www.plymouth.gov.uk/sites/default/files/PlymouthPlanJanuary2021.pdf

the loss of trees, woodlands or hedgerows, cannot be avoided, new native and locally appropriate trees and hedgerows will be secured as mitigation to ensure they contribute to a 'net gain'. Mitigation should be delivered on site, but if this is not achievable, offsite compensation will be required to provide a net gain in canopy cover in line with local standards."

1.4.3 Policy GRO6 of the Plymouth Plan identifies the City Council's expectations for trees and new developments stating *"The City will ensure that the natural environment is fully considered and embedded in the delivery of the city's vision for growth. The Natural Network will consist of a functional network of green and blue spaces that support a high quality of life for communities as well as providing an attractive environment for investment, space for nature to thrive and increased resilience to the impacts of climate change. The Natural Network includes public open space, allotments, play areas, woodlands, trees…"*

1.5 Methodology

1.5.1 The tree survey has been undertaken in accordance with BS5837:2012, from ground level only, to identify the quality, characteristics and constraints posed by trees on Site. Trees have been assigned a category based on their intrinsic non-fiscal qualities (either high quality/category A, moderate quality/category B, low quality/category C and unsuitable for retention /category U), and provided with a sub category (either arboricultural (1), landscape (2) or cultural values (3)). Trees may have more than one sub-categorisation.

1.5.2 Where further inspection is deemed appropriate to ascertain the condition of a tree or other arboreal feature, this has been identified within the preliminary works recommendations. Average dimensions or dimensional ranges have occasionally been used, where appropriate, to best describe features.

1.5.3 Tree positions have been based on aerial imagery and with reference to Site features. As such, tree positions must be treated as indicative only. It is recommended that tree positions are measured and verified on Site prior to any sensitive works being undertaken.

1.5.4 The tree survey update was undertaken in January 2024. The survey extent has been based on the provided red line boundary, as shown on the Tree Survey Plans.

1.6 Tree Categorisation

1.6.1 The categorisation of trees on Site enables the quality and value (in a non-fiscal sense) of the trees to be identified. This information then informs decisions concerning which trees should be retained or removed regarding development.

1.6.2 The assigned category and associated constraints with each tree are shown on the Tree Constraints Plan (Ref: 2140/PCC/BP/OVR_REV A).

1.6.3 The tree categorisation process recommended by BS5837:2012 is summarised in the table below and corresponds with the tree canopy outline shown on the Tree Constraints Plan (Appendix D) and the information in the Tree Survey Schedule (Appendix B).

Category	Definition
A	High quality, minimum of 40+ years remaining contribution
B	Moderate quality, minimum of 20+ years remaining contribution
C	Low quality, minimum of 10+ years remaining contribution
U	Unsuitable for retention, <10 years remaining contribution
1	Arboricultural value
2	Landscape value
3	Conservation or cultural value

Table 2. BS5837:2012 Tree Categorisation process.

2 The Site

2.1 Existing Land Use and Topography

2.1.1 The existing Site use is Plymouth City Centre, predominantly formed of heavily engineered surfacing, landscaping, structures and infrastructure typically associated with the built environment. Site use is predominantly social and retail/commercial usage.

2.1.2 Site topography typically descends from the north to the south towards Royal Parade, with a gradual ascension from Royal Parade to the Plymouth Hoe.

2.2 Soils

2.2.1 No Site-specific soil survey has been undertaken at this stage. The proceeding information has been identified as part of a desk-based study to inform the design, undertaken on 21st November 2021.

2.2.2 The Geology of Britain Viewer[3] was accessed. Site bedrock is identified as Saltash Formation - Slate and Siltstone, Torpoint Formation - Mudstone and Siltstone, Faraday Road Member – Limestone, and Plymouth Limestone Formation – Limestone. No superficial deposits are recorded.

2.2.3 Cranfield University's Soilscapes viewer[4] was accessed. Site soils are described to the north of the Site as freely draining slightly acid loamy soils with low fertility, and to the south as freely draining slightly acid but base-rich soils with high fertility.

2.2.4 Urban soils are typically highly heterogenous due to the nature of urban development, caused by numerous anthropomorphic factors, including the importing of soils, altering soils through compaction and the addition of materials (such as the leaching of lime from building materials causing an increase in soil alkalinity) and the amelioration of soils (such as through organic amendment, rotovation, relocation etc). Therefore, it is considered unlikely that Site soils will reflect those found 'naturally' within the local area. Site specific soil surveys are likely required where it is considered necessary to influence the design of green infrastructure, most notably concerning tree pit design and tree species selection.

2.3 Indirect Damage to Structures by Trees

2.3.1 Shrinkable clay soils may change volume as moisture content fluctuates seasonally. The amount of movement is determined by the changes in moisture content and the properties of the clay soil itself. These moisture content fluctuations cause dimensional changes to the soil. The resulting shrinkage or swelling, if occurring below the level of foundations, can cause subsidence or heave damage to structures, foundations and services.

2.3.2 Trees may significantly affect shrinkable clay soils. Specifically, trees on shrinkable clay soils can lead to seasonal differential movement of structures as moisture is removed from the soil during the growing season.

2.3.3 Tree removals have the potential to cause indirect damage to structures on shrinkable clay soils as a result of heave, where soil moisture levels increase following tree removal. Typically, it is considered that there is no unreasonable risk of heave caused by tree removal where a structure is more than 3 years old, and has experienced no historic subsidence damage and is not currently experiencing subsidence damage.

2.3.4 Specific advice in relation to these issues is beyond the scope of this report; it is recommended that the advice of a suitably qualified engineer is obtained in relation to this issue.

[3] http://mapapps.bgs.ac.uk/geologyofbritain/home.html?&_ga=2.20537912.1685966552.1609328227-1381849347.1609328227
[4] http://www.landis.org.uk/soilscapes/

2.4 Site Impacts on Root Protection Areas (RPAs)

2.4.1 Root protection areas (RPAs) are defined by BS5837:2012 as "*a design tool to indicate the minimum area around a tree deemed to contain sufficient rooting volume to maintain a tree's viability, where the protection of roots and soil structure within the notional area are treated as a priority".*

2.4.2 Rooting environment conditions in proximity to building foundations, heavily engineered surfaces and similar developments within the built environment are likely to hinder normal root development and distribution directly and indirectly through the alteration of soil properties.

2.4.3 These limiting factors for root growth within soil are summarised by Crow (2005) as: mechanical resistance, aeration, fertility and moisture. These factors are likely to be affected not only by human intervention, but also by the innate properties of the soil itself. Heavily engineered hard surfacing, structures and infrastructure typically associated with urban environments (such as drainage systems, utilities, highways and superstructures) are highly likely to significantly affect soil moisture relations through the prevention of infiltration leading to surface runoff, through the compaction of ground reducing field capacity and soil aeration and through the altering of soil structure and properties (such as the prevention of organic nutrient cycling).

2.4.4 BS5837:2012 identifies that roots typically develop within the top 600mm of the soil horizon. This is considered to be where the majority of organic material, soil moisture, aeration and lower soil bulk densities (lower mechanical resistance) are present.

2.4.5 Tree roots may only grow where conditions allow. Therefore, the depth of rooting on Site may be greater than 600mm where conditions allow; conditions may also be present which limit or prevent rooting to this depth.

2.4.6 Tree roots typically taper rapidly after approximately 2-3m from the bases of trees (Dobson 1995). This is termed the 'zone of rapid taper'.

2.4.7 Root systems with a greater depth of potential rooting environment will have a higher potential rooting volume than an equivalent tree subject to shallower rooting conditions. Therefore, the potential maximum rooting depth defines the potential volume of the root zone. The shallower the root zone, the more likely extended lateral rooting is required to achieve a similar root system volume to maintain a tree's 'viability'. The total volume of the root zone may also be influenced by species-specific root architecture.

2.4.8 It is not considered feasible to accurately predict the distribution and volume of an individual tree's root system based on a visual assessment alone. It is considered highly unlikely that a tree's root-system will form a perfect notional circle. Roots will develop where conditions allow, opportunistically, in preference to less favourable areas.

2.4.9 RPA values have been indicated within the tree survey schedule but have not been plotted on the tree survey plan. These will be included within the developed stage 5 report taking account site conditions as they are more accurately identified.

2.5 Statutory Designations

2.5.1 Plymouth City Council's online statutory designation mapping was accessed on 21st November 2021 and 19th October 2022. No TPOs were identified within the red line boundary of the site. A Conservation Area encompasses the lower section of the Site from New George street south, it should be noted that no trees are proposed for removal within this area as shown in Figure 1.

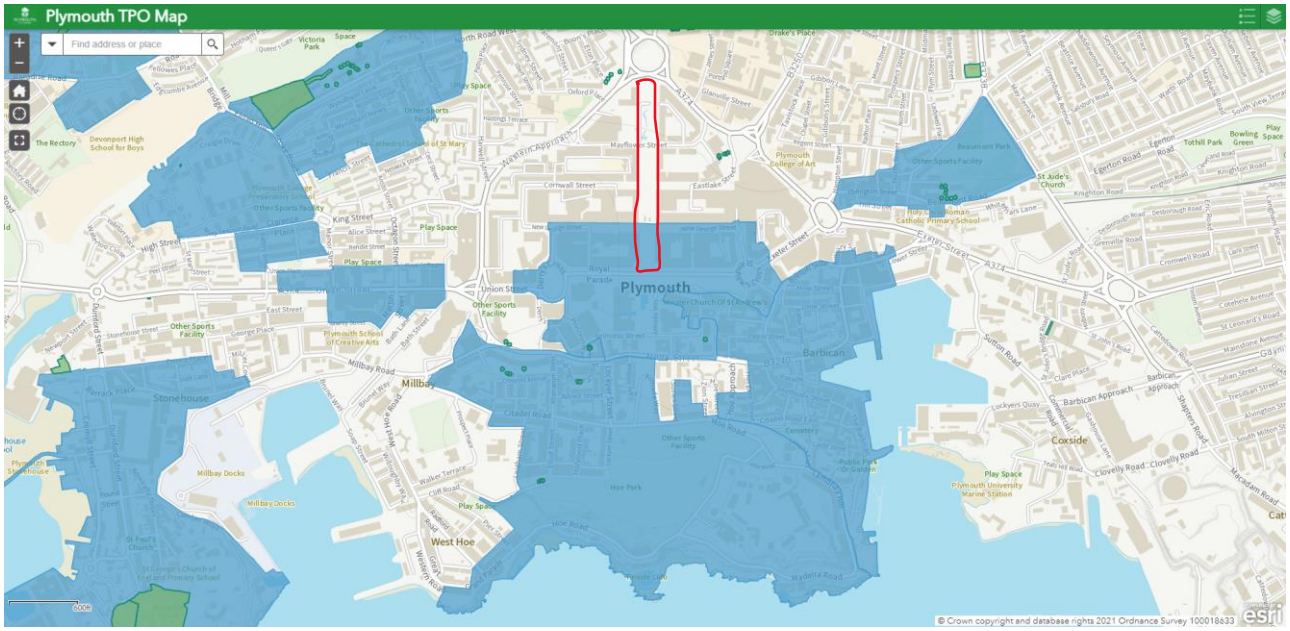

Figure 1. Excerpt showing Conservation Areas in blue within the Site.

2.5.2 As such, no works may be undertaken to trees within Conservation Areas without 6 weeks notification of proposed works (section 211 notice).

2.5.3 Full planning permission is an exception to apply to undertake works to trees in Conservation Areas and an exemption to apply for a Felling Licence from the Forestry Commission. Tree removals necessary to facilitate Permitted Development by a statutory undertaker on operational land or to implement a highways order under the Highways Act is also an exception to these requirements.

2.6 Non-Statutory Designations

2.6.1 A review of Defra's Magic Map[5] was undertaken on 21st November 2021. No recorded ancient semi natural woodland or replanted ancient woodland is identified within or immediately adjacent to the Site.

2.7 The Trees

2.7.1 In total, 43 tree features were identified during the survey, including 1 tree identified as high quality (category A), 30 trees as moderate quality (category B), 9 trees, as low quality (category C) and 3 trees identified as unsuitable for retention in the context of the current land use (category U). The distribution of categories on Site are shown in the figure below.

[5] https://magic.defra.gov.uk/magicmap.aspx

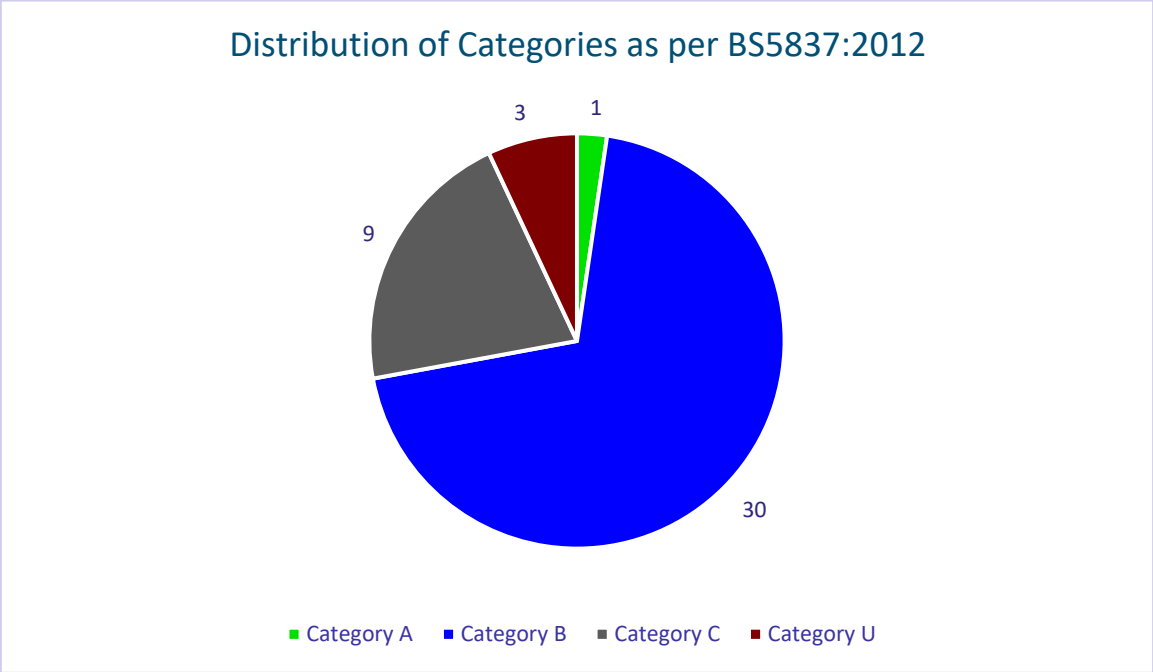

Figure 2 Distribution of Categories as per BS5837:2012.

2.8 Third Party Trees

2.8.1 No third-party trees were identified.

3 Arboricultural Impact Assessment

3.1 Proposed Development

The proposal is for the redevelopment of Armada Way, including new tree planting, hard landscaping and associated infrastructure (the 'Proposed Development') as shown on the General Arrangement Plan 67CA09-STA-ZZ-XX-DR-L-30-001

3.2 Summary of Impacts

3.2.1 A summary of identified impacts to existing trees to facilitate the Proposed Development are given below.

	Categorisation as per BS5837:2012			
Impacts	**Category A / High Quality**	**Category B / Moderate Quality**	**Category C / Low Quality**	**Category U / Unsuitable for Retention**
Tree Removals	0	0	0	0
Total	**0**	**0**	**0**	**0**
Tree Translocation	0	T045	T119, T120, T125	0
Total	**0**	**1 Individual Tree**	**3 individual Trees**	**0**

Table 3. Summary of Impacts.

3.3 Tree Translocation to Facilitate the Proposed Development

3.3.1 Of the total 43 trees on sites none are to be felled to enable development. In total,39 trees within the Site boundary are to be retained and 4 are to be translocated to a new located within Plymouth.

3.4 Assessment on Amenity of Tree Translocations

3.4.1 The translocation of 4 tree features is anticipated to have a negligible impact on Sites amenity and local landscape character in the short-term.

3.4.2 In the long-term, a significant increase in amenity is anticipated through provision of a substantial new tree planting scheme of 163 new trees facilitating: seasonal variation, flowering, fruiting, bark interest, autumnal colour, leaf shape and colour differences, and a diverse mosaic spatial arrangement of tree heights, forms and overall sizes.

3.4.3 The proposals represent a significant investment in the long-term amenity of 'The Green Infastructure' within Armada Way, most notably in relation to increasing resilience. No trees will be felled and the translocated trees will provide ecosystem services within other publicly accessible areas of the city.

3.5 Development within RPAs

3.5.1 No development within RPAs has been identified at this stage.

3.5.2 There is a potential for a limited number of excavations within the RPAs of some of the retained trees. This is awaiting further clarification with the stage 5 design, to assess the distribution of roots in the built environment, most notably relating to tree root foraging beyond the provision of purpose-built tree-pits.

3.5.3 Excavations within the RPAs of retained trees can cause damage to the above and below ground elements of the trees, affects can include:

- A negative effect on structural stability where significant roots are severed in immediate proximity to a retained tree;
- A negative effect on physiological health by limiting water and nutrient uptake, and energy storage; and
- A potential negative affect on life expectancy by facilitating an ingress for wood decay fungi and/or pests and pathogens, and by reducing vitality which may create a spiral of physiological decline.

3.5.4 The potential impact of excavation works within RPAs of retained trees is therefore considered significant.

3.5.5 As mitigation, excavation is to be undertaken utilising hand dig methodologies only, such as by hand tools or through the use of compressed air and a soil vacuum.

3.5.6 Care must be taken not to cause direct damage to roots, including the tearing of roots or the scraping of bark. Damage to fibrous roots (absorptive rather than conductive or structural) is likely to be unavoidable. It is noted by Biddle (1998) that small diameter suberised roots may experience seasonal dieback, with white absorptive roots (and fungal associations) undergoing lifecycles of as little as a few weeks. Seasonal cycles of dieback and regeneration of fibrous and minor roots severed by any excavation may therefore be expected to occur naturally. On this basis, where significant bundles of roots and those woody individual roots are retained and protected during any excavations, impacts to tree physiological and structural health are likely to be minor.

3.5.7 Any exposed roots, including the face of any excavation, must be completely covered with dampened hessian sacking, which will require ongoing re-wetting to avoid desiccation and exposure to light.

3.5.8 All spoil/arisings from excavations will be placed onto ground protection boards to prevent compaction, ground level changes and to assist in removal or reinstatement, where within any rooting area.

3.5.9 Excavation arisings must be reinstated in the correct order to which they were removed, retaining the correct top and sub-soil horizons.

3.5.10 Hard landscaping within the RPAs of retained trees is highly likely to lead to the severance of significant roots and a potential increase in soil levels within RPAs. This is likely to lead to a significant decrease in structural stability and a significant negative impact on physiological health through direct removal of roots and an indirect impact through changes to soil aeration, mechanical resistance and moisture.

3.5.11 These factors are highly likely to lead to premature tree loss in the short and long term. Therefore, any new hard landscaping must prevent the severance of roots and ground compaction within the rootzone. Consideration should also be made for the provision of water infiltration.

3.5.12 Any new hard landscaping within the RPA of retained trees will be installed utilising a ‘no-dig’ system. This may be achieved utilising a proprietary three-dimensional cellular raft system (such as Cellweb or ArborRaft), installed upon the existing ground level. The three-dimensional cellular raft will act as subbase and limit compaction within the rootzone. The raft, where utilised, will be filled with inert, washed, granular material. Where level changes are required, it is likely that the raft-system may be ‘stepped’, utilising multiple cellular raft levels.

3.5.13 Where the utilisation of a proprietary three-dimensional cellular raft is not feasible, piles (installed utilising low impact or ‘hand dig methodologies’) will be utilised, with beams positioned above the existing ground level.

3.6 Access Facilitation Pruning

3.6.1 No tree pruning is identified at this stage.

3.6.2 Contact wounding to stem and branch structures of retained trees is likely to lead to structural instability, a reduction in vitality and a potential ingress for pests and pathogens, including wood decay fungi. This is likely to result in premature limb failure and may lead to premature tree loss where significant.

3.6.3 Where pruning is identified, works will be undertaken in accordance with *BS 3998: 2010 Tree Work – Recommendations*. Pruning points will be made back to the nearest branch or branch collar and no further than the Site boundary, with wounds not exceeding 100mm in diameter.

	Categorisation as per BS5837:2012			
Impact	**Category A / High Quality**	**Category B / Moderate Quality**	**Category C / Low Quality**	**Category U / Unsuitable for Retention**
Facilitation Pruning	**0**	**0**	**0**	**0**
Total	**0**	**0**	**0**	**0**

Table 4. Summary of facilitation pruning.

3.7 RPA or Crown-Spread Access

3.7.1 No access requirements within RPA's or Crown Spreads of existing trees has been identified at this stage.

3.7.2 Plant and personnel access within RPAs is highly likely to significantly compact soils, causing a significant increase in soil bulk density, a reduction in the normal exchange of gases (causing anaerobic soil conditions) and a negative impact on soil water availability. This impact is highly likely to lead to premature tree loss. This impact may take many years to show symptoms prior to rapid tree loss. Typically, soils subject to compaction impacts will not recover without intervention.

3.7.3 Access within the RPAs of retained trees will utilise appropriate ground protection unless positioned on made ground.

	Categorisation as per BS5837:2012			
Impact	**Category A / High Quality**	**Category B / Moderate Quality**	**Category C / Low Quality**	**Category U / Unsuitable for Retention**
RPA or Crown Spread Access	0	0	0	0
Total	**0**	**0**	**0**	**0**

Table 5. Summary of construction access within RPAs.

3.8 Soft landscaping

3.8.1 Soft landscaping works within any RPA will utilise the methodology outlined within Appendix E.

3.9 Organisation of People, Plant and Materials

3.9.1 The storage of materials, the parking of vehicles and the placement of welfare huts and similar within RPAs is highly likely to cause ground compaction, leading to decreased soil aeration, significant increases in the

mechanical resistance of soil and a negative effect on soil water/tree relations. This is likely to lead to premature tree loss.

3.9.2 During the construction cycle, areas outside of RPAs are to be utilised for materials and plant storage, welfare and the mixing of materials. All RPAs will be excluded by utilising Tree Protection Fencing (unless indicated otherwise). All areas inside the Tree Protection Fencing are to be considered as Construction Exclusion Zones and will be treated as sacrosanct. No access into these areas may be undertaken without written consent by PCC and the use of suitable ground protection.

3.9.3 The mixing of materials, and the accidental runoff and spillage thereof within the RPAs of retained trees is likely to cause root death through contamination of the rooting environment. This may lead to premature tree loss.

3.9.4 All mixing of chemicals and substances toxic to trees must be undertaken outside the RPAs of retained trees. Where spillage may enter the rooting environment, the prevention of such will be achieved through the use of bunding.

3.9.5 Direct contact to tree stems facilitates an ingress into the inner wood substrate for wood decay fungi, reduces physiological health of the tree affected and may cause structural instability where the wounding is significant.

3.9.6 Where plant, cranes or any other machinery are operating in proximity to retained trees, a banksman will be required.

4 Future Impact of Retained Trees on the Proposed Development

4.1.1 The future impact of retained trees on the Proposed Development and the surrounding land has been fully considered.

4.2 Future Growth: Conflicts

4.2.1 Trees may damage the built environment through direct contact. This may be either through the whipping of structure surfaces by branch and stem material, or through radial expansion. Direct damage by radial expansion is typically seen in damage to low-weight infrastructure such as heavily engineered surfacing, walls and similar built features where secondary thickening of the stem, buttressing or significant surface roots lift, push or otherwise distort through direct contact.

4.2.2 Typically, the strength of radial expansion is not of significant force to directly move a heavily weighted structure such as significant foundations or similar.

4.2.3 It is widely acknowledged that trees are unable to break into drains/services. Rather, trees exploit weaknesses already present, such as faulty rubber seals on pipeline joints. Where a drainage survey identifies roots within a drainage system, roots may typically be cut out with the identified utility fault ameliorated.

4.2.4 Trees and the surrounding infrastructure should be monitored on a cyclical basis to minimise the effect of direct damage to trees on infrastructure and/or vice versa. Monitoring should include:

- Radial growth in relation to tree pit openings, guards, ties, wiring and other similar rigid structures;
- Growth of crowns in relation to overhead infrastructure and building interfaces; and
- The growth and distribution of any surface roots and buttressing, notably in relation to low-weight built features e.g., hard surfacing and low-weight walls.

4.2.5 This monitoring should be undertaken concurrently with monitoring of trees for formative and structural pruning requirements.

4.3 Shade

4.3.1 In the context of future climate forecasts, the effect of shade by trees to structures and living/social areas is considered positive, enhancing habitat through moderation of temperature and humidity through a reduction in exposure.

4.4 Leaf and Fruit-fall

4.4.1 Leaf and fruit-fall is to be expected. Detritus may be managed as required; the majority of trees on Site and those proposed are deciduous meaning detritus management will be predominantly required in the Autumn.

4.5 Future Land Use and Tree Management

4.5.1 The future land use has been fully considered in relation to the retained trees on and immediately adjacent to the Site. Tree management is not considered to be a significant constraint to developing the Site.

4.5.2 The real risk from trees is extremely low. The Centre for Decision Analysis and Risk Management (DARM) has identified the risk to the public from falling trees as one in 10 million per annum chance of an individual being killed by a falling tree (or part of a tree) per year. This figure is defined by the HSE as "*broadly acceptable*".

4.5.3 Despite this extremely low risk, landowners are required to act as prudent and reasonable to ensure that where reasonably foreseeable, trees which pose unacceptable risks are identified. Landowners must identify trees which pose the greatest risk and implement reasonable controls to keep the risk as low as is reasonably practicable, without diminishing the inherent benefits of trees.

4.5.4 The requirement is defined in an HSE SIM (2007) which highlights that "*Doing all that is reasonably practicably does not mean that all trees have to be individually examined on a regular basis. A decision has to be taken on what is reasonable in the circumstances and this will include consideration of the risks to which people may be exposed."*

4.5.5 Considering the proposed future land use, the tree population on and immediately adjacent to the Site and the likely Site occupancy, formal inspections of the trees are likely to be sufficient.

4.5.6 Formal inspections are those undertaken with the sole purpose of inspecting the trees. Where a tree's health or structural condition is in decline, this will trigger a detailed inspection and/or the implementation of works where suitable.

4.5.7 During the construction cycle, all staff operating on the Site are to be made aware of the need to look out for obvious signs of tree defects and to report them.

5 New and Existing Tree Planting

5.1 Species Selection and Sustainability Assessment

5.1.1 The new and existing tree planting has been specified to follow where practicable the objective of a maximum distribution of 10% species, 20% genus and 30% family distribution. This is undertaken in order to increase diversity within the tree population, to increase resilience to a changing climate, and present and future pests and diseases. One species *Betula utilis jacquemontii* 'Doorenbos' exceeds the 10% figure. This is primarily due to the design intent. This species is closely planted together in a small group to accentuate its bark colour and texture during the winter months. As this species is only planted in one small area it is considered that it follows the basic objective to prevent over dominance throughout the scheme of single species and to reduce the impact on the scheme if one species was to be lost to disease such as ash dieback. It is considered that if in the future, these trees were lost, they could be easily replaced without affecting the rest of the design, and as such follow the principle of the 10-20-30 rule.

5.1.2 The table below shows proposed new species and their distribution.

Proposed Tree Common Name (*Scientific Name)*	*Family*	*Genus*	*Species*	Total No.	Existing Y/N (No. Present if Applicable)	Total Percentage (%) contribution of Specie Planting
alder 'Imperialis' (*Alnus glutinosa* 'Imperialis')	*Betulaceae*	*Alnus*	*glutinosa*	5	N	2.5
Callery pear (*Pyrus calleryana* 'Chanticleer')	*Rosaceae*	*Pyrus*	*calleryana*	6	N	3
common alder (*Alnus glutinosa)*	*Betulaceae*	*Alnus*	*glutinosa*	4	N	2
Crimson Hawthorn (*Crataegus laevigata* Pauls Scarlet)	*Rosaceae*	*Crataegus*	*laevigata*	10	N	5
elm (*Ulmus* 'New Horizon')	*Ulmaceae*	*Ulmus*	'New Horizon'	8	N	4
Cherry Sunset Boulevard *(Prunus Sunset Boulevard)*	*Rosaceae*	*Prunus*	Sunset Boulevard	3		1.5
Red Maple *(Acer Rubrum)*	*Sapindaceae*	*Acer*	rubrum	3	N	1.5
Kobus Magnolia *(Magnolia Kobus)*	*Magnoliaceae*	*Magnoloia*	*kobus*	10	N	5
Cockspur Thorn Crataegus crus-galli	*Rosaceae*	*Cratagus*	*Crus-galli*	11	Y5	5.5
Lienco field maple (*Acer campestre Lienco)*	*Sapindaceae*	*Acer*	*campestre*	17	N	8

Proposed Tree Common Name (*Scientific Name*)	*Family*	*Genus*	*Species*	Total No.	Existing Y/N (No. Present if Applicable)	Total Percentage (%) contribution of Specie Planting
London Plane Platanus x hispanica	*Platanaceae*	*Platanus*	*hispanica*	13	N	6
Love tree (*Cercis siliquastrum)*	*Fabaceae*	*Cercis*	*siliquastrum*	8	N	4
Liquidamber (*Liquidambar styraciflua)*	*Hamamelidaceae*	*Liquidambar*	*styraciflua*	16	Y (16)	8
Maidenhair Tree (*Ginkgo biloba Mayfield)*	*Ginkgoaceae*	*Ginkgo*	*biloba*	10	N	5
Scots Pine (*Pinus sylvestris)*	*Pinaceae*	*Pinus*	*sylvestris*	1	N	.5
Silver Lime *(Tilia tomentosa* 'Barbant')	*Malvaceae*	*Tilia*	*tomentosa*	3	N	1.5
Himalayan Birch Betula utilis jacquemontii 'Doorenbos'	*Betulaceae*	*Betula*	*utilis*	28	N	14
Snowy Mespilus (*Amelanchier lamarckii)*	*Rosaceae*	*Amelanchier*	*lamarckii*	6	N	3
Stone Pine (*Pinus pinea)*	*Pinaceae*	*Pinus*	*pinea*	12	N	6
Tree of Heaven (*Ailanthus altissima)*	*Simaroubaceae*	*Ailanthus*	*altissima*	1	Y (1)	.5
Turkish Hazel (*Corylus colurna)*	*Betulaceae*	*Corylus*	*colurna*	10	N	5
Flowering Cherry *(Prunus sp)*	*Rosaceae*	*Prunus*	*sp*	1	1Y	.5
Wild Cherry *(Prunus avium)*	*Rosaceae*	*Prunus*	*avium*	2	2Y	1
Sorbus *(Sorbus sp)*	*Rosaceae*	*Sorbus*	*sp*	1	1Y	.5
Sorbus (*Sorbus thuringiaca)*	*Rosaceae*	*Sorbus*	*thuringiaca*	2	2Y	1
Laburnum *(Laburnum anagyroides)*	*Fabaceae*	*Laburnum*	*anagyroides*	3	3Y	1.5
Norway Maple *(Acer platanoides)*	*Sapindaceae*	*Acer*	*platanoides*	1	1Y	.5
Horse Chestnut *(Aesculus hippocastanum)*	*Sapindaceae*	*Aesculus*	*hippocastanum*	5	5Y	2.5
Single Leaved Ash Fraxinus excelsior f.diversifolia	*Oleaceae*	*Fraxinus*	*excelsior*	2	2Y	1

Table 6 Proposed new and retained trees and their distribution.

5.1.3 The family distribution of new and existing trees within the development area is shown in the table below.

Family	No. of Trees	Total Percentage (%) contribution of Family to scheme
Betulaceae	47	23
Fabaceae	11	5.5
Olaceae	2	1
Ginkgoaceae	10	5
Hamamelidaceae	16	8
Malvaceae	3	1.5
Rosaceae	42	21
Sapindaceae	26	12.5
Simaroubaceae	1	.5
Ulmaceae	8	4
Pinaceae	13	6.5
Magnoliaceae	10	5
Platanaceae	13	6.5

Table 7 Family Distribution of new and existing trees.

5.1.4 The genera distribution of new and existing trees within the development area is shown in the table below.

Genus	No. of Trees within scheme	Total Percentage (%) contribution of Genus to new scheme
Acer	21	10.5
Aesculus	5	2.5
Ailanthus	1	.5
Alnus	9	4.5
Amelanchier	6	3
Betula	28	14
Cercis	8	4
Corylus	10	5
Crataegus	22	11
Franinus	2	1

Genus	No. of Trees within scheme	Total Percentage (%) contribution of Genus to new scheme
Ginkgo	10	5
Laburnum	3	1.5
Liquidambar	16	8
Magnolia	10	5
Platanus	13	6.5
Prunus	3	1.5
Pyrus	6	3
Tilia	3	1.5
Ulmus	8	4
Pinus	13	6.5
Sorbus	3	1.5

Table 8 Genera distribution of new and existing trees.

5.2 New Tree Procurement

5.2.1 Trees will be procured and planted in accordance with British Standards *BS8545:2014 Trees: from nursery to independence in the landscape - Recommendations*, with the nursery provider demonstrating plant health certification and/or an adopted biosecurity policy.

5.3 New Tree Planting

5.3.1 Plants will be stored for the minimum feasible period prior to planting. Where required, the rootzones will be watered to prevent desiccation.

5.3.2 Immediately prior to planting, all hessian wraps or other rootball covers are to be removed (where applicable).

5.3.3 Rootballs are to be wetted immediately prior to planting.

5.3.4 The excavation for the tree planting within the cultivated tree pits will be two to three times the diameter of the rootball. The excavated pit sides will be scarified if smeared.

5.3.5 Trees will be planted at a depth no greater than the root-flare.

5.3.6 Soil will be reinstated to the correct horizons around the rootball in layers of no greater than 150mm. Each layer is to be firmed (e.g., 'heeled in') to remove excessive air pockets, taking care not to over-compact the soil.

5.3.7 Trees will be staked and tied in accordance with landscape architects details (unless secured by underground ties or similar).

5.3.8 Where feasible, good quality woodchip mulch will be placed on the existing ground level at a depth in accordance with the landscape specifications |(usually 75mm), with no mulch in contact with the stem. This is to cover a radius of at least 1m from the base of each tree.

5.3.9 Planting pits may be sown with annual/perennial herbaceous seed mixes as required outside of the mulched areas. The retention of bare-earth is to be avoided.

5.4 Aftercare and Maintenance

Formative Pruning

5.4.1 Formative pruning on young trees is recommended to form a structurally durable stem and branching structure, increasing a tree's long term life expectancy and ultimately, reducing the future burden for tree works.

5.4.2 The principal strategy for young tree formative pruning is to:

1 Develop and maintain a dominant leading stem;

2 Maintain branches to less than half the diameter of the parent stem;

3 Remove branches with any bark inclusion of the union; and

4 Prevent branches below the permanent crown from reaching a significant size.

Mulching

Where feasible, good quality woodchip mulch will be placed annually to maintain a mulch depth of 75mm, to cover a radius of at least 1m from the base of each tree, for a minimum of three years post planting.

Watering

5.4.3 Watering will be carried out in accordance with the landscape management plan to ensure trees do not become dehydrated.

5.4.4 During any periods of drought, trees may require additional watering. The maintenance of mulch around the rootzone reduces the likelihood for this requirement.

Stake and Ties

5.4.5 Where applicable, stakes and ties will be monitored annually.

5.4.6 Stakes and ties will be removed following tree establishment. This is likely to be after three years post planting. Trees will be examined by a competent person prior to stake and tie removal.

6 Feasibility Conclusion

6.1.1 The Proposed Development has been designed to create a resilient, sustainable and socially valuable commercial area within Plymouth City Centre.

6.1.2 In total, 39 tree features within the Site boundary are to be retained and 4 trees are to be translocated, **no** trees are to be felled to enable the development.

6.1.3 The translocation of the 4 trees is anticipated to have a negligible negative affect on Site amenity and local landscape character in the short-term. In the medium to long-term, an increase in amenity is anticipated through provision of a significant new tree planting scheme facilitating: seasonal variation, flowering, fruiting, bark interest, autumnal colour, leaf shape and colour differences, and a diverse mosaic spatial arrangement of tree heights, forms and overall sizes. The tree translocations therefore represent a significant investment in the long-term amenity of 'The Green Infrstructure' within Armada Way, most notably in relation to increasing resilience.

6.1.4 Development within the RPAs will utilise either a proprietary three-dimensional cellular raft system or where this is not feasible, piles with beams positioned above the existing ground level.

6.1.5 Where excavations are proposed within the RPAs an assessment of the distribution of roots in the built environment, most notably relating to tree root foraging beyond the provision of purpose-built tree-pits. Excavations will be undertaken by hand-dig mythologies only.

6.1.6 All access within the RPAs of retained trees will require the use of appropriate ground protection unless positioned on made ground.

6.2 Tree Protection

6.2.1 All retained trees on Site will require adequate protection to ensure that no damage, both direct and indirect, occurs during the development cycle. Areas for tree protection are to be identified on the Tree Protection Plan which will be produced during the stage 5 of this project.

6.2.2 Tree Protection Fencing and ground protection will require installation prior to the commencement of Site works.

6.3 Issues to be Addressed by an Arboricultural Method Statement

6.3.1 Arboricultural Method Statements detail the methodology for the implementation of any aspect of development that is within a root protection area or has the potential to result in loss of or damage to a retained tree. As per Section 5.4.3 (h) of BS5837:2012, the following issues may be addressed by an Arboricultural Method Statement:

- Tree Protection Fencing and installation;
- Site Monitoring;
- Excavations and hard landscaping works within RPAs; and
- Organisation of Site huts, parking, plant, people and materials.

6.3.2 The Arboricultural Method statement will be produced during Stage 5 of this project.

7 References

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Appendix A Tree Survey Plans

APPENDIX B- Tree Survey Plan (sheet 1)

ENVIRONMENTAL CONSULTANTS

Project Title
Armada Way

Client
Morgan Sindall Construction and Infrastructure Ltd

Drawing Title
Tree Survey Plan Draft (Sheet 001)

General Notes
1. Do not scale from this drawing.
2. All dimension, co-ordinates, and levels are shown in meters unless otherwise stated.
3. Tree positions are based on indicative plotting only. As such, tree positions must be treated as indicative only and reviewed on Site as required.
4. © Crown copyright and database rights 2021 Ordnance Survey 0100031673
5. The original of this drawing was produced in colour. A monochrome copy should not be relied upon.

Key Plan

Key
- Survey boundary.
- Site boundary.
- Tree location and number

Revision	By/Check	Date	Suffi x

YGS Environmental Consultants Ltd. Larch Grove, Plymouth, PL7 5EB. Tel.: 01752 337700 E: info@ygs-ec.co.uk W: www.ygs-ec.co.uk

Contractors must check all dimensions on site, only figured dimensions are to be worked from. Any discrepancies identified must be reported to the landscape architect before proceeding.

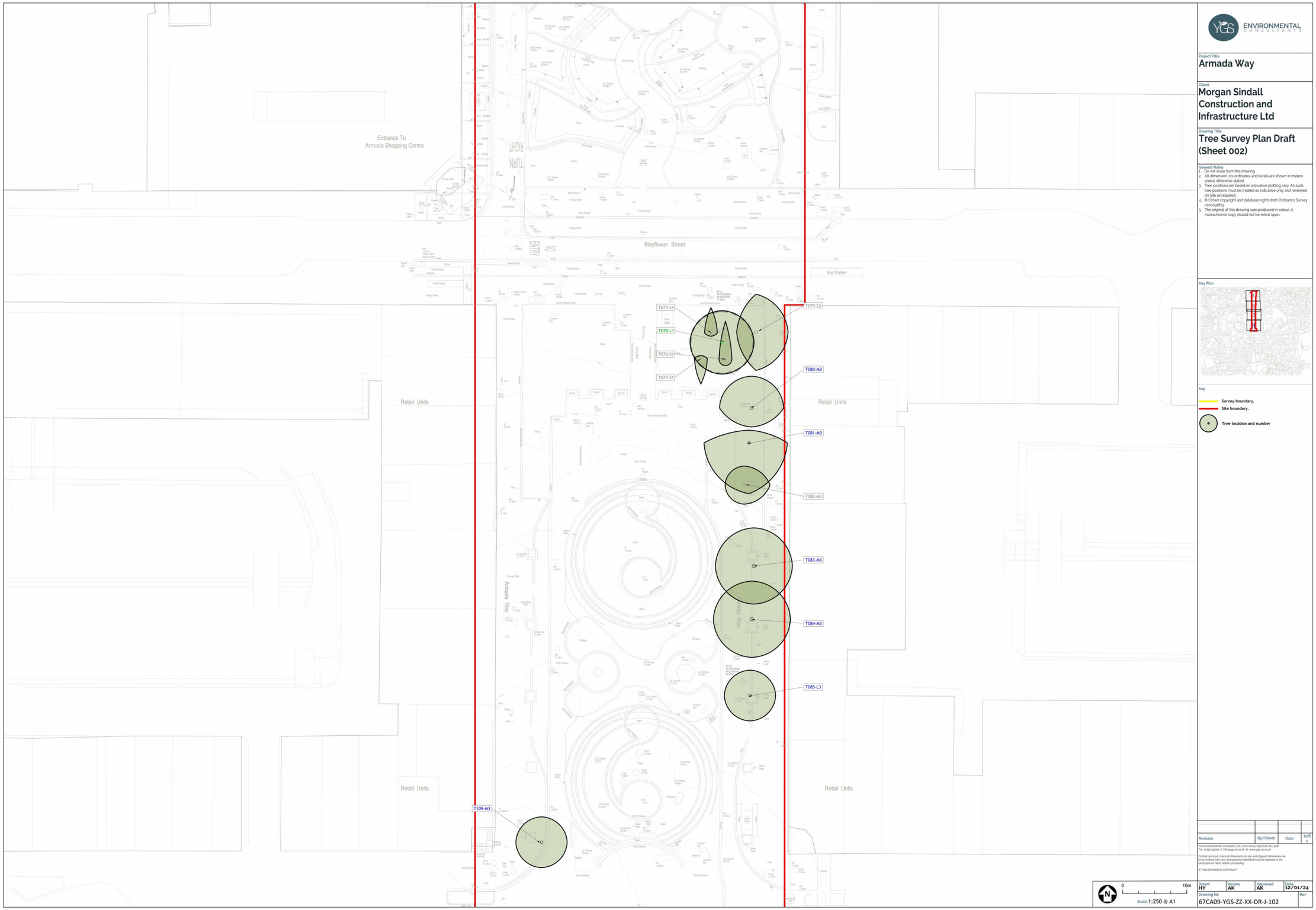
© THIS DRAWING IS COPYRIGHT

0 10m
Scale: 1:250 @ A1

Drawn	Reviewer	Approved	Date
HY	AK	AK	12/01/24

Drawing No: 67CA09-YGS-ZZ-XX-DR-J-101 Rev

APPENDIX B- Tree Survey Plan (sheet 2)



ENVIRONMENTAL CONSULTANTS

Project Title
Armada Way

Client
Morgan Sindall Construction and Infrastructure Ltd

Drawing Title
Tree Survey Plan Draft (Sheet 002)

General Notes
1. Do not scale from this drawing.
2. All dimension, co-ordinates, and levels are shown in meters unless otherwise stated.
3. Tree positions are based on indicative plotting only. As such, tree positions must be treated as indicative only and reviewed on Site as required.
4. © Crown copyright and database rights 2021 Ordnance Survey 0100031673
5. The original of this drawing was produced in colour. A monochrome copy should not be relied upon.

Key Plan

Revision	By/Check	Date	Suffix

YGS Environmental Consultants Ltd, Lamb Grove, Plymouth, PL7 5EB
Tel: 01752 337700 E: info@ygs-ec.co.uk W: www.ygs-ec.co.uk

Contractors must check all dimensions on site, only figured dimensions are to be worked from. Any discrepancies identified must be reported to the landscape architect before proceeding.

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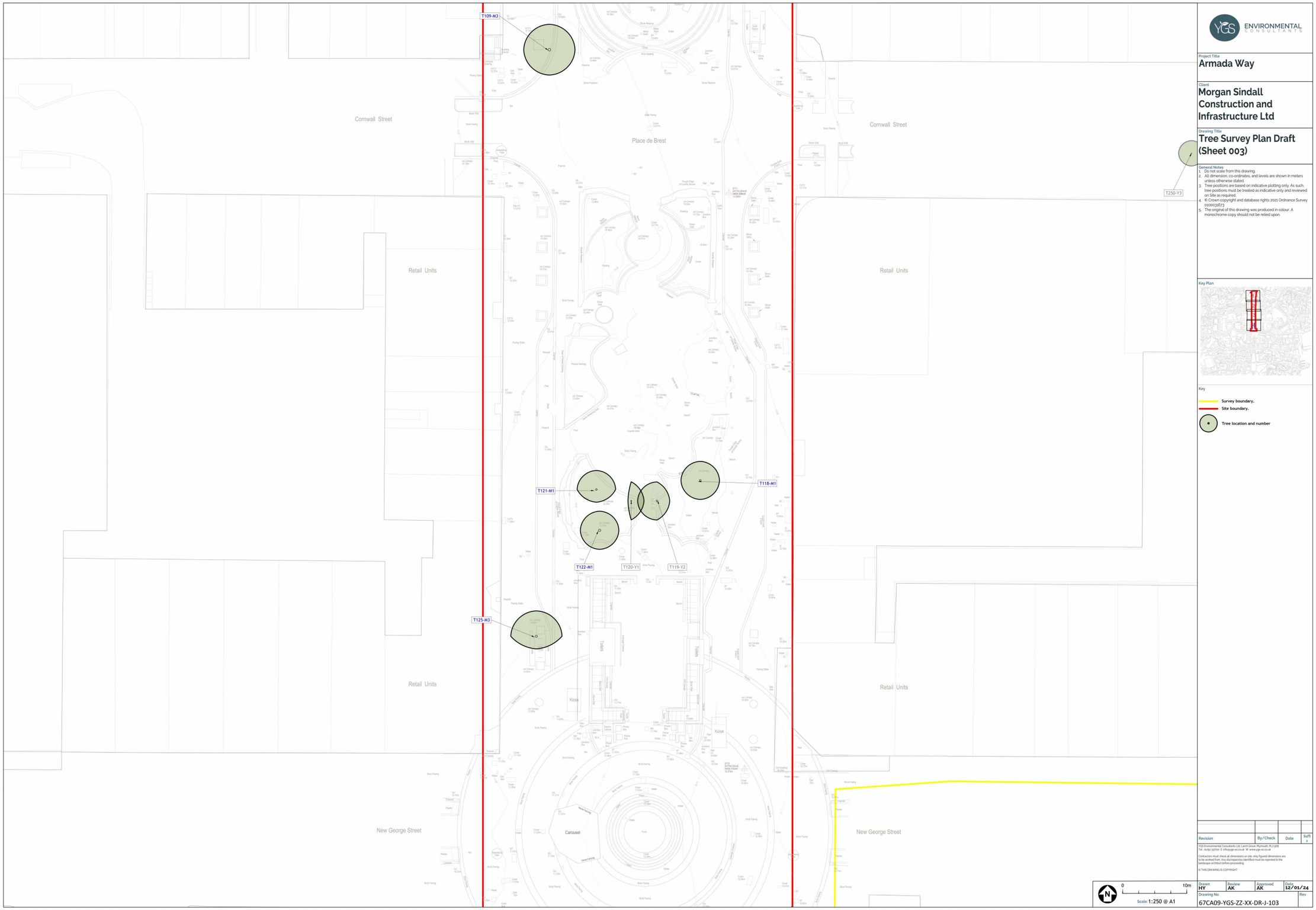
Drawn	Reviewer	Approved	Date
HY	AK	AK	12/01/24

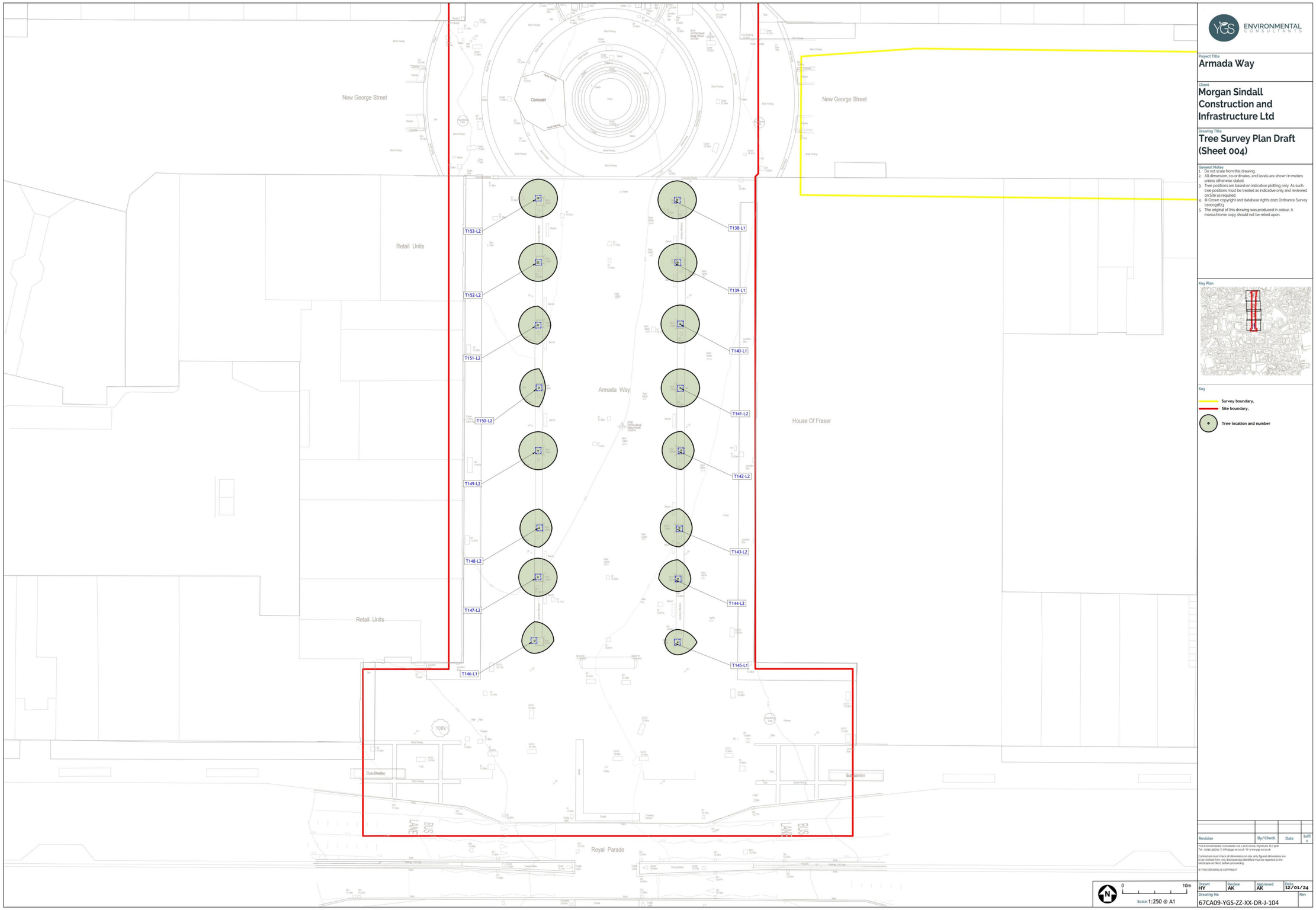
Drawing No
67CA09-YGS-ZZ-XX-DR-J-102

Rev

APPENDIX B- Tree Survey Plan (sheet 3)



APPENDIX B- Tree Survey Plan (sheet 4)



APPENDIX B- Abbreviated Tree Survey Schedule

Ref	Common Name	Scientific Name	Variety	Ht (m)	Stem Diam (mm)	Multiple Stem diam (mm)	RPA	Crown Spread				Crown Clearance (m)	Lowest Branch (m)	Lowest Branch Dir	Life Stage	General Observations	**Preliminary Works Recommendations**	Rem. Contrib.	Retention Category	Retained (RET) / Moved (TRANS) for the Development
								N	E	S	W									
T001	Cockspur Thorn	*Crataegus crus-galli*		6	300		Radius: 3.6m. Area: 41 sq m.	3.5	3	2	3	2.5	2	N	Mature	Previous pruning wounds back to stem branch collars. Typically with peripheral asymmetrical woundwood development. Cavities forming, likely localised to collars. Limited long-term retention due to a lack of durable heartwood.		20+ Years	B2	RET
T002	Cockspur Thorn	*Crataegus crus-galli*		4	220		Radius: 2.6m. Area: 21 sq m.	3	3	3	3	2	2	W	Semi Mature	Contact wounding to base south, likely mechanical. Good peripheral woundwood formation. Likely to occlude. Previous pruning wounds with peripheral woundwood. Cavity forming in collar south at 2m, likely localised, considered minor.		10+ Years	C1,2	RET
T003	Wild Cherry	*Prunus avium*		6	310		Radius: 3.7m. Area: 43 sq m.	5	5	5	4	2	3	S	Early Mature	Tree circa 1m north of planter edging. Likely to cause future damage to planter edge stones through growth of surface rooting. Species propensity to form surface roots. Previous crown raising works, wounds flush to main stem, asymmetrical woundwood. Surface rooting around base to 1m, typical of species.		20+ Years	B1,2	RET
T004	Wild Cherry	*Prunus avium*		5	250		Radius: 3.0m. Area: 28 sq m.	6	4	5	5	1.5	2	N	Semi Mature	High crown sparsity in crown east, poor internal bud/leaf proliferation. Potential cause root disturbance limiting water uptake reducing leaf volume east. Twig dieback in crown. Pruning wounds in crown with good woundwood. Base 1m from planter edge. Likely to cause future structural damage.		10+ Years	C1,2	RET

Ref	Common Name	Scientific Name	Variety	Ht (m)	Stem Diam (mm)	Multiple Stem diam (mm)	RPA	Crown Spread				Crown Clearance (m)	Lowest Branch (m)	Lowest Branch Dir	Life Stage	General Observations	**Preliminary Works Recommendations**	Rem. Contrib.	Retention Category	Retained (RET) / Moved (TRANS) for the Development
								N	E	S	W									
T005	Cockspur Thorn	*Crataegus crus-galli*		5	260		Radius: 3.1m. Area: 30 sq m.	2	2	2	2	2	3	E	Early Mature	Minor contact wounding to base west with good woundwood, likely to occlude. Previous crown raising works with numerous wounds to main stem branch collars. Peripheral woundwood with cavity formation, likely localised to collars.		20+ Years	B2	RET
T006	Cockspur Thorn	*Crataegus crus-galli*		6	270		Radius: 3.2m. Area: 32 sq m.	3	4	3	4	2	2	SW	Mature	Minor deadwood in crown, normal volume for species and age. Codominant with thorn south. Pruning wound to stem north at 1.8m with good woundwood, likely to occlude.		20+ Years	B1,2	RET
T007	Cockspur Thorn	*Crataegus crus-galli*		6.5	390		Radius: 4.7m. Area: 69 sq m.	5	5.5	4	4.5	2	2	E	Mature	Limited long term future potential as tree is considered to of reached maturity for species, with limited long-term retention in maturity. Minor deadwood in crown, normal for species and age, low risk. Pruning and contact wounds with peripheral woundwood. Multiple limbs in lower crown north with assumed previous poor pruning, internodal with tear wounds. Now forming likely dead stubs.		20+ Years	B2	RET
T008	Tree of Heaven	*Ailanthus altissima*		10	590		Radius: 7.1m. Area: 158 sq m.	6	7	5	4	2	3	SE	Mature	Tree non-native invasive species. Produces prolific suckering. Base 1m southwest of raised landscape bed. Surface rooting extending 2m southwest, significant contact wounding, peripheral woundwood. Codominant stem from 2m, potential for future bark inclusion at union. Moderate deadwood in crown, normal for species and age, low risk.		20+ Years	B1	RET

Ref	Common Name	Scientific Name	Variety	Ht (m)	Stem Diam (mm)	Multiple Stem diam (mm)	RPA	Crown Spread				Crown Clearance (m)	Lowest Branch (m)	Lowest Branch Dir	Life Stage	General Observations	**Preliminary Works Recommendations**	Rem. Contrib.	Retention Category	Retained (RET) / Moved (TRANS) for the Development
								N	E	S	W									
T045	Whitebeam	*Sorbus aria*		7	310		Radius: 3.7m. Area: 43 sq m.	4	4	3	4	2.5	2	E	Early Mature	Codominant in canopy. Proliferation of secondary limbs from circa 2.5m, typical of cultivar. Ivy on stem limiting visibility. Minor bark inclusions visible.		20+ Years	B2	TRANS
T075	Common Laburnum	*Laburnum anagyroides*		4	210		Radius: 2.5m. Area: 20 sq m.	4	1	0.5	1	1.5	1.5	S	Early Mature	Lean north, corrective growth of third order limbs south. Significant structural suppression. Previous limb removal at base with decay visible, peripheral woundwood with good adaptive growth. Wound to upper side of second order limb north at 2m with decay visible, low risk.		<10 Years	U	RET
T076	Common Laburnum	*Laburnum anagyroides*		4	170		Radius: 2.0m. Area: 13 sq m.	6	1	1	1	2	1.5	N	Semi Mature	Significant lean north, upper crown corrective growth. Likely previous codominant stem removal at base south. Decay of collar, peripheral woundwood, adaptive swelling.		<10 Years	U	RET
T077	Common Laburnum	*Laburnum anagyroides*		3	120		Radius: 1.4m. Area: 6 sq m.	0.5	1	4	1	2	2.5	S	Semi Mature	Significant lean south with corrective growth from circa 1m. Previous significant stem removal at base west, decay of collar with peripheral woundwood and adaptive swelling present. Pruning wounds with minor cavities. Of minor landscape benefit.		<10 Years	U	RET
T078	Norway Maple	*Acer platanoides*	Crimson King	14	420		Radius: 4.9m. Area: 75 sq m.	5	5	5	5	6	6	SW	Mature	Dominant. High landscape value. Considered of significant future potential.		40+ Years	A1,2	RET
T079	Horse Chestnut	*Aesculus hippocastanum*		15	520		Radius: 6.2m. Area: 121 sq m.	6	5	6	3	4	3.5	N	Mature	Included bark union from circa 3m. West with significant included bark and no adaptive growth. East with adaptive growth, included bark on upper side of union. Crown in contact with building interface east. Requires ongoing cyclical management. Base circa 250mm west of low height retaining wall.	Prune to clear building interface by 2m, back to nearest lateral branch or branch collar (< 3 months)	10+ Years	C1,2	RET

Ref	Common Name	Scientific Name	Variety	Ht (m)	Stem Diam (mm)	Multiple Stem diam (mm)	RPA	Crown Spread				Crown Clearance (m)	Lowest Branch (m)	Lowest Branch Dir	Life Stage	General Observations	**Preliminary Works Recommendations**	Rem. Contrib.	Retention Category	Retained (RET) / Moved (TRANS) for the Development
								N	E	S	W									
T080	Horse Chestnut	*Aesculus hippocastanum*		15	500		Radius: 6.0m. Area: 113 sq m.	5	5	3	5	4	2	S	Mature	Likely historic pollard or previously topped. Secondary stems with high aspect ratios, circa 1:3, arising at 2m. Crown adjacent to building interface. Will likely require cyclical pruning to manage back from building. Base circa 300mm west of low height wall, damage to top dressing visible.		20+ Years	B1,2	RET
T081	Single Leafed Ash	*Fraxinus excelsior f. diversifolia*		15	390		Radius: 4.7m. Area: 69 sq m.	2	6	8	7	3	2	W	Mature	Codominant. Suppressing cherry south. Crown 1m from building interface east. Major deadwood in central crown over amenity grass.	Remove deadwood (< 1 month)	20+ Years	B1,2	RET
T082	Flowering Cherry	*Prunus sp.*		5	330		Radius: 4.0m. Area: 50 sq m.	3	4	3	3	3	2	E	Mature	Structurally suppressed by ash north. Secondary stems arising from circa 1.8m with minor bark inclusions, normal for species. Previously crown reduced. Dysfunction at pruning points, no woundwood visible. Moderate deadwood in crown over amenity grass planter, low risk. Lean of main stem east, corrective growth of secondary limbs. Crown regrowth extending east towards building. Will require pruning in future.		10+ Years	C1,2	RET
T083	Horse Chestnut	*Aesculus hippocastanum*		16	550		Radius: 6.5m. Area: 133 sq m.	6	6	6	6	5	3	S	Mature	Bare earth in 200mm radial square from base. Tarmac or similar beyond. Likely historic lapsed pollard. Proliferation of secondary stems from circa 2.5m. Minor bark inclusions. Crown apices east in contact with building interface. Previously pruned back. Pruning wounds to main stem south at circa 3m, significant wounds with asymmetrical woundwood formation or no woundwoood.		20+ Years	B1,2	RET

Ref	Common Name	Scientific Name	Variety	Ht (m)	Stem Diam (mm)	Multiple Stem diam (mm)	RPA	Crown Spread				Crown Clearance (m)	Lowest Branch (m)	Lowest Branch Dir	Life Stage	General Observations	**Preliminary Works Recommendations**	Rem. Contrib.	Retention Category	Retained (RET) / Moved (TRANS) for the Development
								N	E	S	W									
T084	Horse Chestnut	*Aesculus hippocastanum*		16	530		Radius: 6.2m. Area: 121 sq m.	6	6	6	6	4	3	N	Mature	Bare earth in 200mm radial square from base. Tarmac or similar beyond. Likely historic lapsed pollard. Proliferation of secondary stems from circa 2.5m. Minor bark inclusions. Crown apices east in contact with building interface. Previously crown reduced. Requires management on secondary pollard cycle. Suggested rotation of 5 years. Wound to main stem north at 2m, likely second order limb union failure, dysfunction of exposed wood, good woundwood formation, partially occluded. Prolific surface rooting at base, unlikely to be girdling, crown vitality normal.		20+ Years	B1,2	RET
T085	Horse Chestnut	*Aesculus hippocastanum*		10	380		Radius: 4.4m. Area: 61 sq m.	4	4	4	4	2	2	W	Early Mature	Bare earth in 200mm radial square from base. Tarmac or similar beyond. Previous crown reduction, wounds circa 50mm in diameter and under. Full regrowth with diameters of 20mm and under. Requires management on pollard cycle. Wiring in crown. Pruning wounds partially and fully occluded.		20+ Years	B1,2	RET
T109	Single Leafed Ash	*Fraxinus excelsior f. diversifolia*		12	410		Radius: 4.9m. Area: 75 sq m.	4	4	4	4	6	4	E	Mature	Radial 200mm square of bare earth from base, tarmac beyond. Previous crown reduction. Wounds circa 50mm in diameter. Will require pollarding regime to maintain crown away from building interface west.		20+ Years	C1	RET
T118	Sorbus	*Sorbus thuringiaca*		6	260		Radius: 3.1m. Area: 30 sq m.	3	3	3	3	3	2	W	Semi Mature	Proliferation of secondary stems from 2m, typical of cultivar. Minor bark inclusions. Wound to stem at 1m east almost fully occluded. Slight lean northwest with crown corrective growth.		10+ Years	C1	RET

Ref	Common Name	Scientific Name	Variety	Ht (m)	Stem Diam (mm)	Multiple Stem diam (mm)	RPA	Crown Spread				Crown Clearance (m)	Lowest Branch (m)	Lowest Branch Dir	Life Stage	General Observations	**Preliminary Works Recommendations**	Rem. Contrib.	Retention Category	Retained (RET) / Moved (TRANS) for the Development
								N	E	S	W									
T119	Japanese Maple	*Acer palmatum*		4		80, 80, 60, 50, 50, 130, 120, 110	Radius: 3.1m. Area: 30 sq m.	3	2	3	3	2.5	0.5	SE	Early Mature	Base circa 300mm east of retaining wall, no damage visible. Multistemmed form with minor bark inclusions, typical of species. Specimen considered replaceable within short time-frame.		10+ Years	C1	TRANS
T120	Japanese Maple	*Acer palmatum*		4		70, 70, 100, 80	Radius: 1.9m. Area: 11 sq m.	3	2	3	0.5	2.5	0.5	S	Semi Mature	Multistemmed with included bark, typical of species. Multiple contact wounds to stems, good woundwood formation. Likely to occlude. Specimen considered replaceable.		10+ Years	C1	TRANS
T121	Sorbus	*Sorbus sp.*		6	270		Radius: 3.2m. Area: 32 sq m.	3	3	2	3	3	2	W	Semi Mature	Proliferation of secondary stems from 2m, typical of cultivar. Minor bark inclusions. Wound to stem at 1m east almost fully occluded. Slight lean northwest with crown corrective growth.		20+ Years	B2	RET
T122	Sorbus	*Sorbus thuringiaca*		6	380		Radius: 4.6m. Area: 66 sq m.	3	3	3	3	3	2	E	Mature	Proliferation of secondary stems from 2m, typical of cultivar. Minor bark inclusions. Helical rib formation, minor.		20+ Years	B2	RET
T125	Silver Maple	*Acer saccharinum*		9	330		Radius: 4.0m. Area: 50 sq m.	4	4	2	4	4	3	E	Early Mature	Bare earth square 200mm radially from base with significant surface rooting/buttressing. Previously reduced, with further reduction pruning 1m above. Internodal. Shopping basket in crown. Significant wound north at circa 2m, likely previous secondary limb union failure. Good woundwood, partial occlusion. Significant pruning wound flush to main stem at 2m north, circa 200mm in diameter, asymmetrical woundwood.		20+ Years	C1	TRANS

Ref	Common Name	Scientific Name	Variety	Ht (m)	Stem Diam (mm)	Multiple Stem diam (mm)	RPA	Crown Spread				Crown Clearance (m)	Lowest Branch (m)	Lowest Branch Dir	Life Stage	General Observations	**Preliminary Works Recommendations**	Rem. Contrib.	Retention Category	Retained (RET) / Moved (TRANS) for the Development
								N	E	S	W									
T138	Sweet Gum	*Liquidambar styraciflua*		11 (9)	225 (220)		Radius: 2.6m. Area: 21 sq m.	3	3	3	3	3	3	S	Semi Mature	Within likely adjustable tree pit. Significant future potential. Appropriate species selection and location of establishment. Wiring in crown.		20+ Years	B1,2	RET
T139	Sweet Gum	*Liquidambar styraciflua*		11 (9)	235 (220)		Radius: 2.6m. Area: 21 sq m.	3	3	3	3	3	3	S	Semi Mature	Within likely adjustable tree pit. Significant future potential. Appropriate species selection and location of establishment. Wiring in crown.		20+ Years	B1,2	RET
T140	Sweet Gum	*Liquidambar styraciflua*		11 (9)	205 (200)		Radius: 2.4m. Area: 18 sq m.	3	3	3	3	3	3	NW	Semi Mature	Within likely adjustable tree pit. Significant future potential. Appropriate species selection and location of establishment. Wiring in crown.		20+ Years	B1,2	RET
T141	Sweet Gum	*Liquidambar styraciflua*		11 (9)	230 (210)		Radius: 2.5m. Area: 20 sq m.	3	3	3	3	3	3	NE	Semi Mature	Within likely adjustable tree pit. Significant future potential. Appropriate species selection and location of establishment. Wiring in crown. Pruning wounds to main stem almost fully occluded. Lifting of tree pit grate east.		20+ Years	B1,2	RET
T142	Sweet Gum	*Liquidambar styraciflua*		10 (8)	210		Radius: 2.5m. Area: 20 sq m.	3	2	3	3	3	3	W	Semi Mature	Within likely adjustable tree pit. Significant future potential. Appropriate species selection and location of establishment. Wiring in crown. Stem base circa 10mm from tree pit grate edge - adjust.	Increase size of tree pit opening (< 1 month)	20+ Years	B1,2	RET
T143	Sweet Gum	*Liquidambar styraciflua*		10 (8)	210 (200)		Radius: 2.4m. Area: 18 sq m.	3	2	3	3	3	3	W	Semi Mature	Within likely adjustable tree pit. Significant future potential. Appropriate species selection and location of establishment. Wiring in crown. Pruning wounds to main stem, good woundwood, partially occluded. Stem base circa 10mm from tree pit grate edge - adjust. Partial lifting of tree pit grate east.	Increase size of tree pit opening (< 1 month)	20+ Years	B1,2	RET

Ref	Common Name	Scientific Name	Variety	Ht (m)	Stem Diam (mm)	Multiple Stem diam (mm)	RPA	Crown Spread				Crown Clearance (m)	Lowest Branch (m)	Lowest Branch Dir	Life Stage	General Observations	**Preliminary Works Recommendations**	Rem. Contrib.	Retention Category	Retained (RET) / Moved (TRANS) for the Development
								N	E	S	W									
T144	Sweet Gum	*Liquidambar styraciflua*		10 (7)	205 (200)		Radius: 2.4m. Area: 18 sq m.	3	2	2	3	3	3	SW	Semi Mature	Within likely adjustable tree pit. Significant future potential. Appropriate species selection and location of establishment. Wiring in crown. Pruning wounds to main stem partially occluded. Lifting of tree pit grate around base.	Adjust tree pit grate (< 1 month)	20+ Years	B1,2	RET
T145	Sweet Gum	*Liquidambar styraciflua*		9 (7)	185 (180)		Radius: 2.2m. Area: 15 sq m.	2	3	2	2	3	3	W	Semi Mature	Within likely adjustable tree pit. Significant future potential. Appropriate species selection and location of establishment. Wiring in crown. Pruning wounds to main stem almost fully occluded.		20+ Years	B1,2	RET
T146	Sweet Gum	*Liquidambar styraciflua*		9.5 (7)	215 (200)		Radius: 2.4m. Area: 18 sq m.	3	3	2	2	3.5	3	NW	Semi Mature	Within likely adjustable tree pit. Significant future potential. Appropriate species selection and location of establishment. Wiring in crown. Pruning wounds to main stem partially occluded.		20+ Years	B1,2	RET
T147	Sweet Gum	*Liquidambar styraciflua*		10 (8)	245 (230)		Radius: 2.8m. Area: 25 sq m.	3	3	3	3	3	3	N	Semi Mature	Within likely adjustable tree pit. Significant future potential. Appropriate species selection and location of establishment. Wiring in crown. Pruning wounds to main stem partially occluded. Significant lifting of tree pit grate.	Ameliorate tree pit grate (< 1 month)	20+ Years	B1,2	RET
T148	Sweet Gum	*Liquidambar styraciflua*		10.5 (8)	210		Radius: 2.5m. Area: 20 sq m.	3	2	3	3	3.5	3.5	NE	Semi Mature	Within likely adjustable tree pit. Significant future potential. Appropriate species selection and location of establishment. Wiring in crown. Pruning wounds to main stem partially occluded. Lifting of tree pit grate.	Ameliorate tree pit grate (< 1 month)	20+ Years	B1,2	RET
T149	Sweet Gum	*Liquidambar styraciflua*		9.5 (8)	210		Radius: 2.5m. Area: 20 sq m.	3	3	3	3	4	4	E	Semi Mature	Within likely adjustable tree pit. Significant future potential. Appropriate species selection and location of establishment. Wiring in crown. Pruning wounds to main stem partially occluded. Very minor lifting of tree pit grate.	Ameliorate tree pit grate (< 12 months)	20+ Years	B1,2	RET

Ref	Common Name	Scientific Name	Variety	Ht (m)	Stem Diam (mm)	Multiple Stem diam (mm)	RPA	Crown Spread				Crown Clearance (m)	Lowest Branch (m)	Lowest Branch Dir	Life Stage	General Observations	**Preliminary Works Recommendations**	Rem. Contrib.	Retention Category	Retained (RET) / Moved (TRANS) for the Development
								N	E	S	W									
T150	Sweet Gum	*Liquidambar styraciflua*		12.5 10	230 (220)		Radius: 2.6m. Area: 21 sq m.	3	1	3	3	4	4	S	Semi Mature	Within likely adjustable tree pit. Significant future potential. Appropriate species selection and location of establishment. Wiring in crown. Pruning wounds to main stem partially occluded. Lifting of tree pit grate. Minor deadwood in crown, normal volume, low risk.	Ameliorate tree pit grate (< 1 month)	20+ Years	B1,2	RET
T151	Sweet Gum	*Liquidambar styraciflua*		11 (9)	240 (230)		Radius: 2.8m. Area: 25 sq m.	3	2	3	3	4	4	S	Semi Mature	Within likely adjustable tree pit. Significant future potential. Appropriate species selection and location of establishment. Wiring in crown. Pruning wounds to main stem with asymmetrical peripheral woundwood.		20+ Years	B1,2	RET
T152	Sweet Gum	*Liquidambar styraciflua*		11.5 (10)	290 (280)		Radius: 3.4m. Area: 36 sq m.	3	3	3	3	4	4	S	Semi Mature	Within likely adjustable tree pit. Significant future potential. Appropriate species selection and location of establishment. Wiring in crown. Pruning wounds to main stem partially occluded. Lifting of tree pit grate. Stem in immediate contact with tree pit grate edge.	Ameliorate tree pit grate (< 1 month)	20+ Years	B1,2	RET
T153	Sweet Gum	*Liquidambar styraciflua*		11.5 (9)	225 (220)		Radius: 2.6m. Area: 21 sq m.	3	3	3	3	3	3.5	S	Semi Mature	Within likely adjustable tree pit. Significant future potential. Appropriate species selection and location of establishment. Wiring in crown. Pruning wounds to main stem partially occluded. Significant lifting of tree pit grate.	Ameliorate tree pit grate (< 1 month)	20+ Years	B1,2	RET

APPENDIX C Tree Protection Plans (Draft)

ENVIRONMENTAL CONSULTANTS

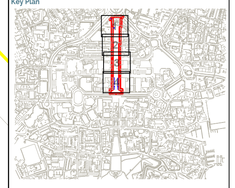
Project Title
Armada Way

Client
Morgan Sindall Construction and Infrastructure Ltd

Drawing Title
Tree Protection Plan Draft (Sheet 001)

General Notes
1. Do not scale from this drawing.
2. All dimension, co-ordinates, and levels are shown in meters unless otherwise stated.
3. Tree positions are based on indicative plotting only. As such, tree positions must be treated as indicative only and reviewed on Site as required.
4. © Crown copyright and database rights 2021 Ordnance Survey 0100031673
5. The original of this drawing was produced in colour. A monochrome copy should not be relied upon.

Key Plan



Key

- Survey boundary.
- Site boundary.
- Trees proposed for translocation
- Trees for retention
- Root protection areas (RPA) *(as defined by bs 5837:2012)*

Revision	By/Check	Date	Suffix
			x

YGS Environmental Consultants Ltd, Larch Grove, Plymouth. PL7 5EB
Tel: 01752 337751 E: info@ygs-ec.co.uk W: www.ygs-ec.co.uk

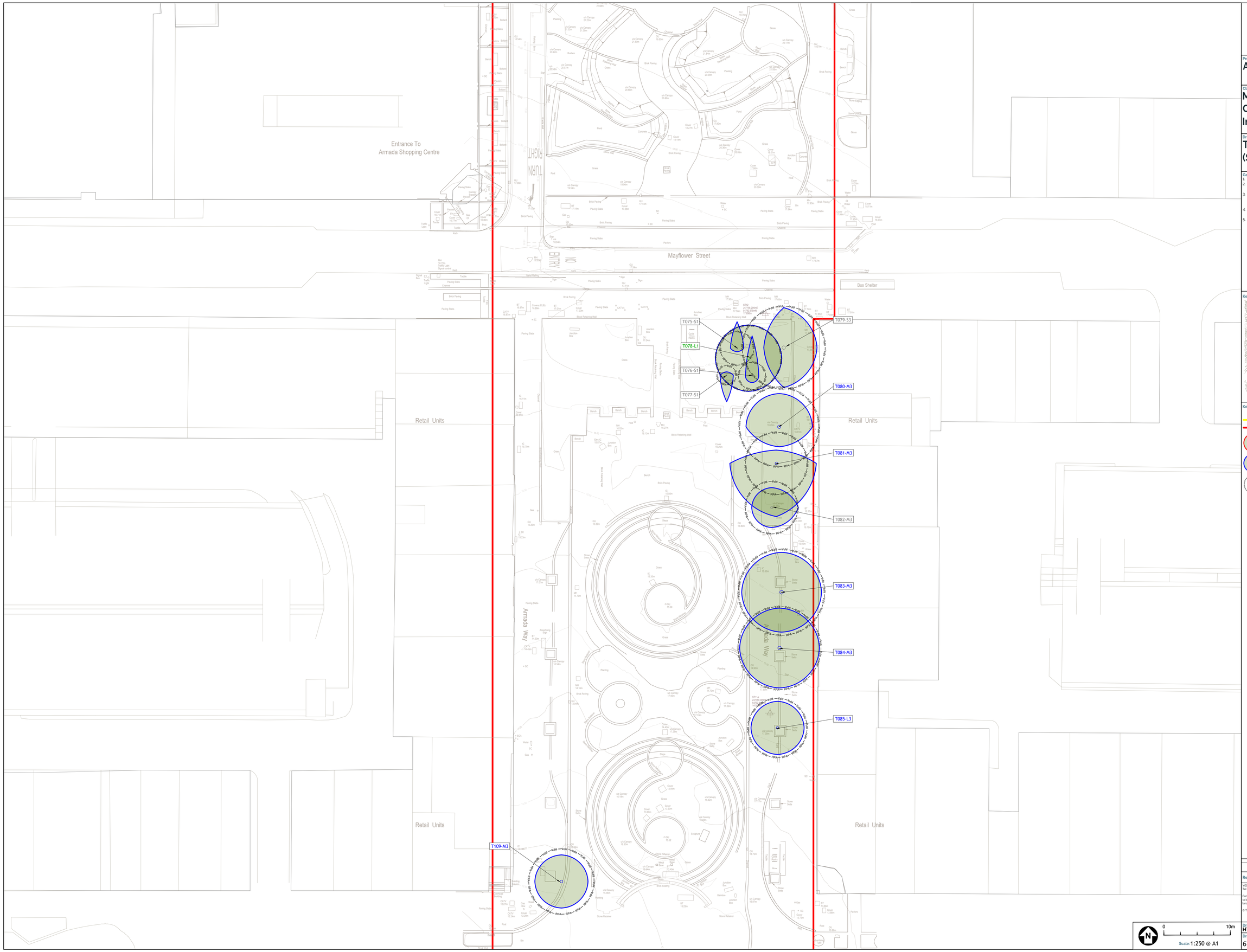
0 10m

Scale: 1:250 @ A1

Drawn	Review	Approved	Date
HY	AK	AK	12/01/24

Drawing No: 67CA09-YGS-ZZ-XX-DR-J-105

Rev:



ENVIRONMENTAL CONSULTANTS

Project Title
Armada Way

Client
Morgan Sindall Construction and Infrastructure Ltd

Drawing Title
Tree Protection Plan Draft (Sheet 002)

General Notes
1. Do not scale from this drawing.
2. All dimension, co-ordinates, and levels are shown in meters unless otherwise stated.
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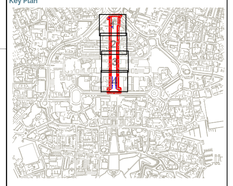
Key Plan



Key

- Survey boundary.
- Site boundary.
- Trees proposed for translocation
- Trees for retention
- Root protection areas (RPA) *(as defined by bs 5837:2012)*

Revision	By/Check	Date	Suffi x

YGS Environmental Consultants Ltd, Larch Grove, Plymouth. PL7 5EB
Tel: 01752 337710 E: info@ygs-ec.co.uk W: www.ygs-ec.co.uk

Contractors must check all dimensions on site, only figured dimensions are to be worked from. Any discrepancies identified must be reported to the landscape architect before proceeding.

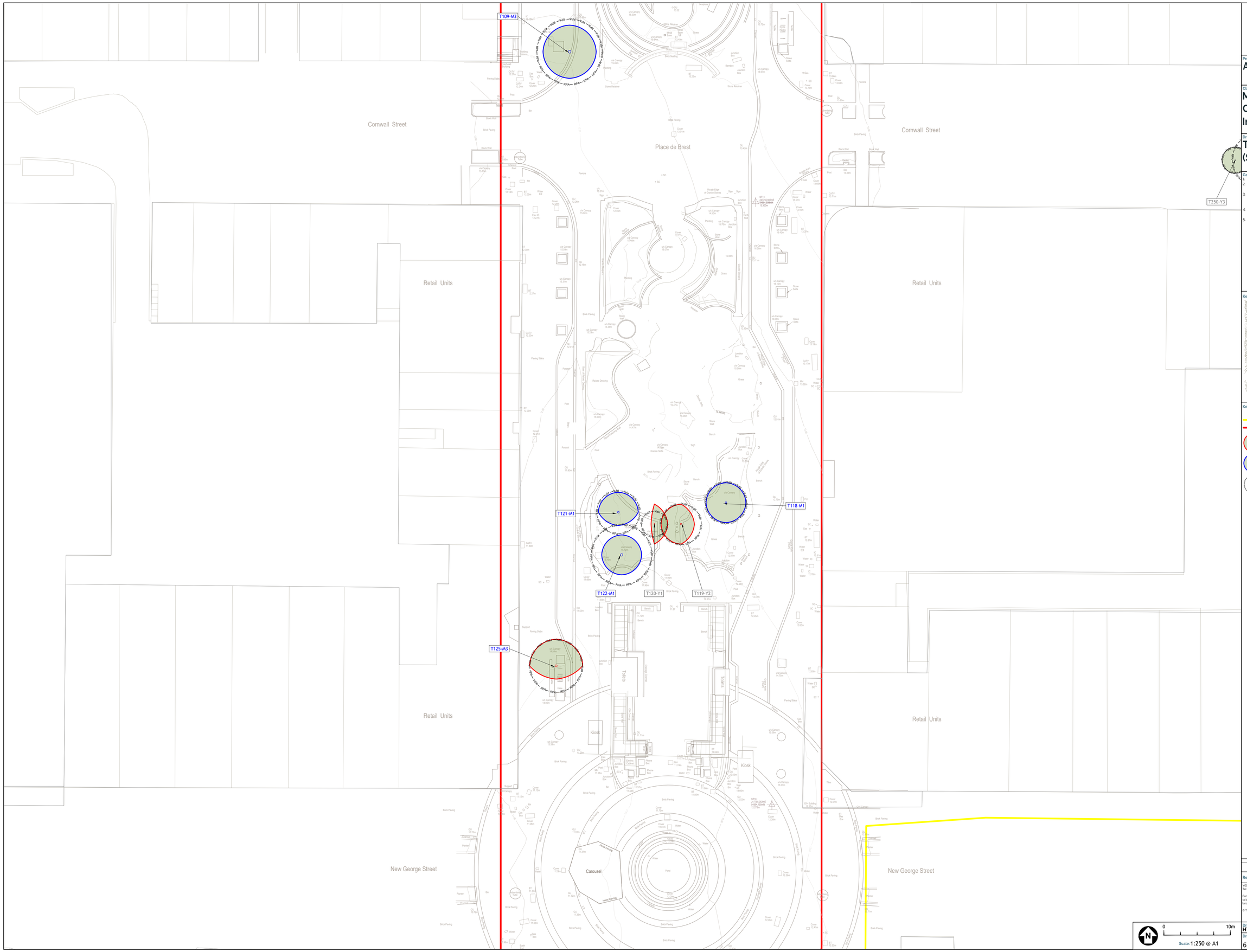
0 10m

Scale: 1:250 @ A1

Drawn	Review	Approved	Date
HY	AK	AK	12/01/24

Drawing No: 67CA09-YGS-ZZ-XX-DR-J-106

Rev:



ENVIRONMENTAL CONSULTANTS

Project Title
Armada Way

Client
Morgan Sindall Construction and Infrastructure Ltd

Drawing Title
Tree Protection Plan Draft (Sheet 003)

General Notes
1. Do not scale from this drawing.
2. All dimension, co-ordinates, and levels are shown in meters unless otherwise stated.
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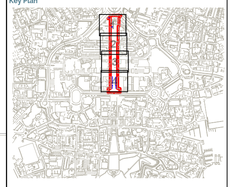
Key Plan



Key

- Survey boundary.
- Site boundary.
- Trees proposed for translocation
- Trees for retention
- Root protection areas (RPA) *(as defined by bs 5837:2012)*

Revision	By/Check	Date	Suffi x

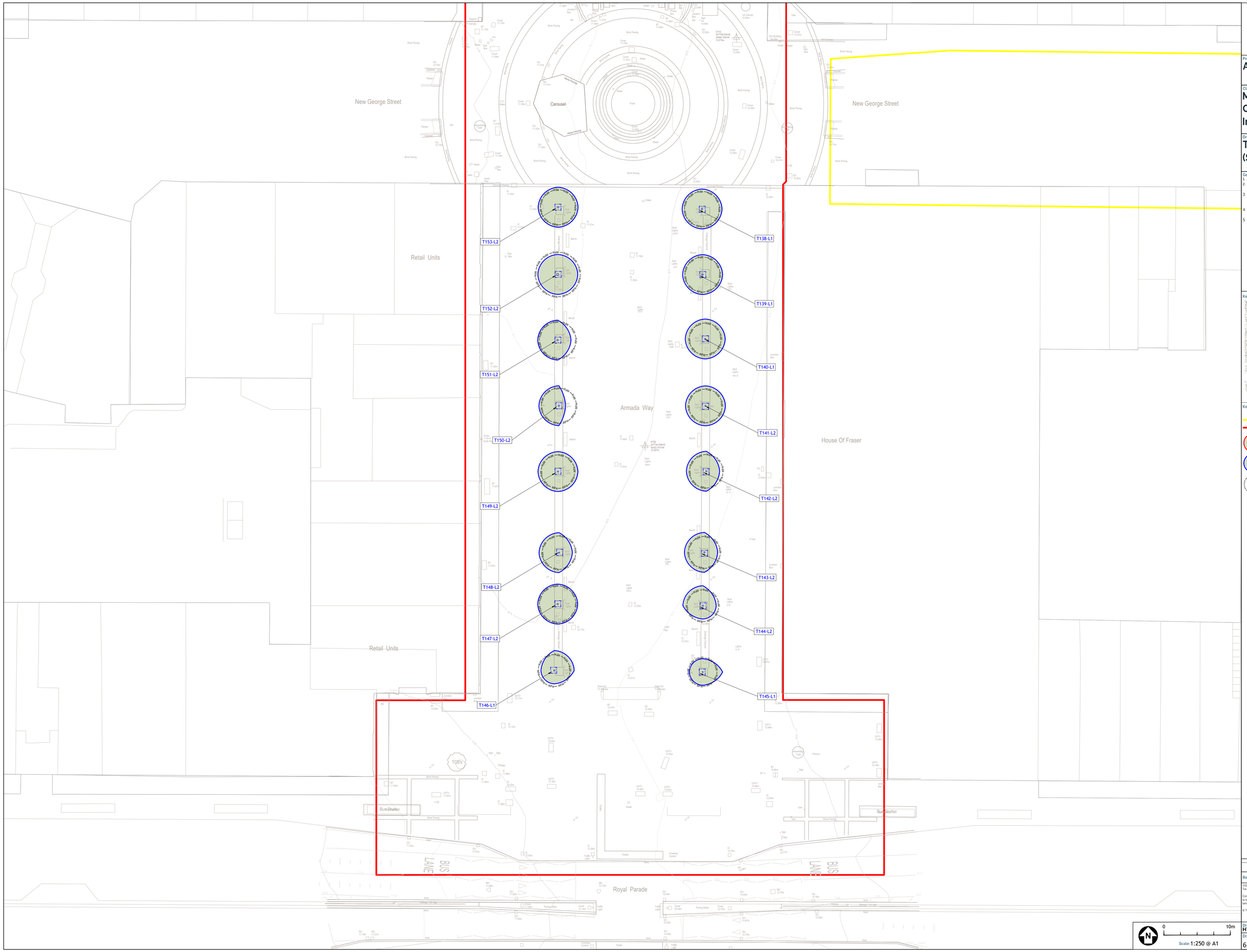
YGS Environmental Consultants Ltd, Larch Grove, Plymouth. PL7 5EB
Tel: 01752 337151 E: info@ygs-ec.co.uk W: www.ygs-ec.co.uk

Contractors must check all dimensions on site, only figured dimensions are to be worked from. Any discrepancies identified must be reported to the landscape architect before proceeding.

0 10m
Scale: 1:250 @ A1

Drawn	Review	Approved	Date
HY	AK	AK	12/01/24

Drawing No: 67CA09-YGS-ZZ-XX-DR-J-107 Rev



ENVIRONMENTAL CONSULTANTS

Project Title
Armada Way

Client
Morgan Sindall Construction and Infrastructure Ltd

Drawing Title
Tree Protection Plan Draft (Sheet 004)

General Notes
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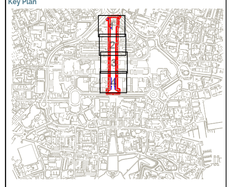
Key Plan



Key

- Survey boundary.
- Site boundary.
- Trees proposed for translocation
- Trees for retention
- Root protection areas (RPA) *(as defined by bs 5837:2012)*

Revision	By/Check	Date	Suffix

YGS Environmental Consultants Ltd. Larch Grove. Plymouth. PL7 5EB
Tel: 01752 337750 E: info@ygs-ec.co.uk W: www.ygs-ec.co.uk

Contractors must check all dimensions on site, only figured dimensions are to be worked from. Any discrepancies identified must be reported to the landscape architect before proceeding.

0 10m

Scale: 1:250 @ A1

Drawn	Review	Approved	Date
HY	AK	AK	12/01/24

Drawing No
67CA09-YGS-ZZ-XX-DR-J-108

Rev

APPENDIX D Tree Survey Key

Key	Description	
Tree No on plan	Identification number indicating individual tree (T), group (G). woodland (W) or hedge (H) on the plan.	
#	Indicates estimated dimensions for inaccessible trees, such as trees positioned outside of the site.	
Species	Species shown as common name first, followed by the scientific name given in brackets.	
Ht	Height of tree, measured from ground level, given in metres (m). Recorded to the nearest half metre for dimensions up to 10m and the nearest whole metre over 10m.	
Crown Spread (M)	Crown spread of tree, measured from ground level, given in metres for cardinal points north, south, east and west. Rounded up to the nearest metre.	
Stem Dia @1.5m (mm)	Diameter of stem measured at 1.5m above ground level, given in milometers (mm), rounded to the nearest 10mm.	
RPA Radius (M)	Radius of root protection area, as defined by BS5837:2012 as twelve times the diameter of the stem(s) measured at 1.5m above ground level.	
RPA Circle Area (M2)	Area of the root protection circle, given as metres squared.	
Ht of lowest branch (m) & direction of growth	Height of lowest branch measured from ground level, given in metres and the direction of the branch given as a cardinal point (e.g. northeast). Recorded to the nearest half metre for dimensions up to 10m and the nearest whole metre over 10m.	
Life Stage	Young	Tree(s) in the young growth phase for the species.
	Semi-mature	Tree(s) in semi-mature growth phase for the species.
	Mature	Tree(s) at maturity for species.
	Over-Mature	Tree(s) at over-maturity for species.
	Ancient/Veteran	Tree(s) considered to be either Ancient or Veteran.
Estimated Remaining Contribution in Years	Estimation of the tree's remaining contribution given in years, as either less than 10 years (<10), at least 10 years (10+), at least 20 years (20+) and at least 40 years (40+).	
General Observation	Physiological	Good – Of normal physiological health for the species.
		Fair – Of identifiable physiological decline for the species, from the considered normal.
		Poor – Of identifiable significant decline for the physiological normal of the species, likely requires further management works unless indicated.
		Dead – Tree(s) dead. May still provide ecological value, such as standing deadwood and similar.
	Structural	Good - Of normal structural health for the species.
		Fair – Of identifiable deviation from normal structural formation from the expected species growth habit.

Key	Description	
		Poor – of identifiable significant deviation from the expected normal species structural health. Likely requires further management works unless indicated.
		Dead - Tree(s) dead. May still provide ecological value, such as standing deadwood and similar.
Preliminary Management Recommendations	Further works as identified by the site survey, to be actioned as per the indicated timescale.	
Category of Retention	Category A - High Quality	
	Category B - Medium Quality	
	Category C - Low Quality	
	Category U - Unsuitable for retention (in the context of the current land use)	
Sub Category	1 - Mainly Arboricultural Qualities	
	2 - Mainly Landscape Qualities	
	3 - Mainly Cultural Values	

APPENDIX E Tree Protection (General)

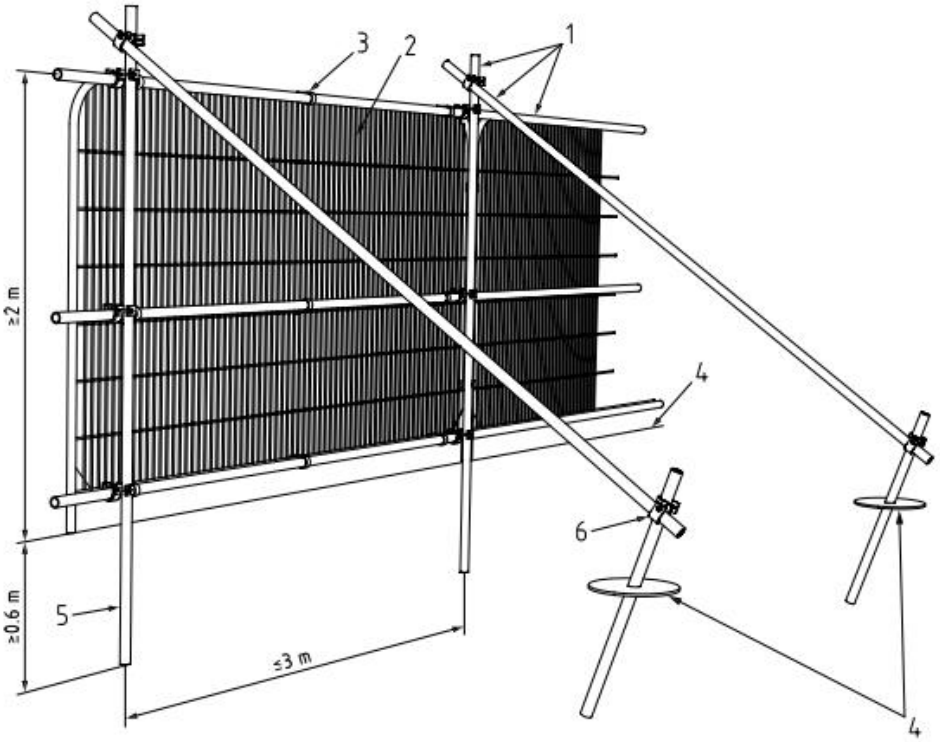
E1 Background

Retained trees on Site form a constraint to development works. Where trees are retained, adequate protection must be maintained at all times, to avoid tree damage and premature tree death. Damage to retained trees may result in a breach of planning conditions, which may lead to works being halted, a fine of up to £20,000 in a Magistrates Court and an unlimited fine in a Crown Court. Consideration must therefore be made for the use of barriers and ground protection, detailed below. Locations for Tree Protection Fencing and ground protection are shown on the Tree Protection Plan.

E2 Barriers

Fit for purpose barriers, to exclude construction activities from RPAs of retained trees will be required on Site, installed prior to the commencement of works and dismantled upon Site completion.

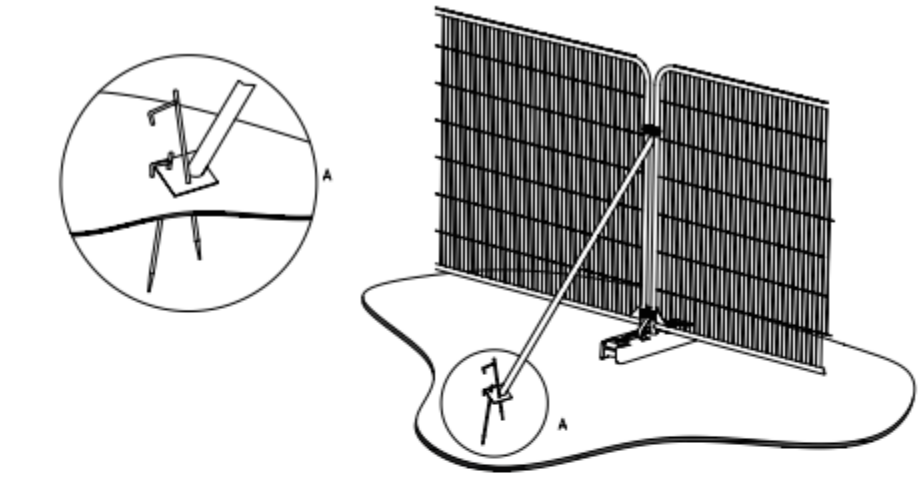
The default specification is shown below (Figures 2 and 3 of BS5837:2012).



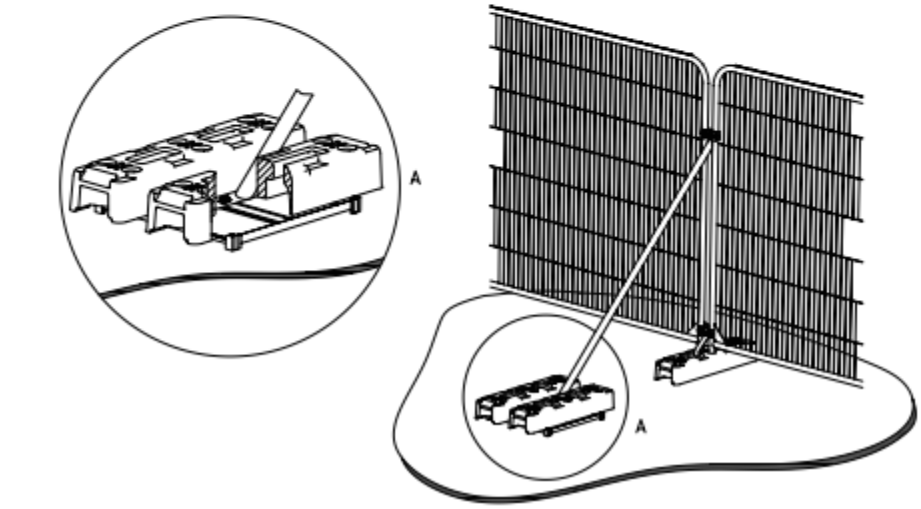
Key

1 Standard scaffold poles
2 Heavy gauge 2 m tall galvanized tube and welded mesh infill panels
3 Panels secured to uprights and cross-members with wire ties
4 Ground level
5 Uprights driven into the ground until secure (minimum depth 0.6 m)
6 Standard scaffold clamps

Figure 1. Default barrier specification (Figure 2., of BS5837:2012).



a) Stabilizer strut with base plate secured with ground pins



b) Stabilizer strut mounted on block tray

Figure 2. Default barrier specification (Figure 3. of BS5837:2012).

E3 Ground Protection

Within RPAs and other identified areas, soils must be protected from construction activities. Temporary ground protection will be necessary where access into any construction exclusion zone is required, by pedestrians and plant. As a guideline, the following is applicable:

- For pedestrian use: a single thickness of scaffold board, placed on top of either a suspended walkway (such as single scaffold frame) or on a compressive resistant layer (such as 100mm depth of woodchip) laid onto a geotextile membrane.
- For pedestrian operated plant up to gross 2 tonne weight: proprietary inter-linked ground protection boards placed on top of a compression resistant layer (such as 150mm depth of woodchip, laid on a geotextile membrane).
- For traffic exceeding 2 tonnes gross weight: a proprietary system (such as cellular rafts or pre-cast concrete slabs) to an engineering specification designed in conjunction with arboricultural advice, designed to dissipate the expected loading.

E4 New Services

Standard installation practises for the installation of underground services (such as open face excavations or mechanical trenching) are likely to sever significant roots, cause tree instability and premature death where undertaken within any RPAs of retained trees on Site.

The default position is that all services be located outside of any RPAs.

Where installing new services within RPAs, the use of two techniques are suggested. These are:

1) The use of trenchless techniques (such as impact moling) to cross underneath any RPA, with entry and retrieval pits sited outside of the RPAs; or

2) Hand dig excavation methodologies, utilising compressed air and a soil vacuum, or hand tools, to carefully excavate within an RPA, retaining and protecting any roots encountered. (N.B. This technique is not applicable for services that lack flexibility and cannot be installed around any significant roots encountered, e.g., precast concrete).

Where possible, consideration for the bundling of services should be made to avoid multiple excavations.

E5 Soft Landscaping

Mechanical stripping and cultivation of soil is highly likely to sever roots creating a potential ingress for wood decay fungi, reduce physiological health and potentially significantly affect tree stability. Where impacts are significant, premature tree loss is likely.

No mechanical cultivation of soils may be undertaken within the RPAs of any retained trees. Access will be by pedestrian only. Where cultivation is required, this shall be undertaken by hand dig methodologies only. Where any raising of topsoil is required, this shall not exceed 100mm in depth and will be of good quality and freely draining.

APPENDIX F Tree Translocation Report

ENVIRONMENTAL CONSULTANTS

Armada Way

TREE TRANSLOCATION ASSESSMENT

Client: Plymouth City Council

November 2023

Prepared For:

Plymouth City Council

Prepared By:

YGS Environmental Consultants Ltd

Larch Grove

Plymouth

PL7 5EB

Tel: 01752 337710

info@ygs-ec.co.uk

Issue Schedule					
Issue Code	**Date**	**Comments**	**By**	**Verified**	**Approved**
P01	02/11/23	Draft	AK /JK	AK	SWB
P02	06/11/23	Final	AK /JK	AK	SWB
P03	07/11/23	Final Appendix A drawing updated	AK /JK	AK	SWB
P04	17/11/23	Peer Reviewed with minor updates	AK /JK	DS	DS

Contents

1 Introduction

1.1 Background

YGS Environmental Consultants Ltd has been commissioned by Plymouth City Council [PCC] to produce an Arboricultural Package for the Armada Way redesign, as part of the Plymouth City Council's Better Places Plan.

The proposed new design requires a number of existing trees to be translocated (moved), as they will prevent installation of the new sustainable urban drainage system, along with associated changes in ground levels. Some of the trees are also situated on the route of the proposed 12-metre-wide cycle and pedestrian route through the centre, which plays a critical role in opening up the vista to the Hoe. The trees will be replanted at the new arboretum that is being created at The Park in Plympton.

Tree assessment and scoping has already identified key issues related to the translocation of the six subject trees.

1.2 Objectives of this Report

This report has been prepared by YGS with input from an independent Chartered Arboriculturist and a peer review and verification by an additional Chartered Arboriculturist. The report findings are based on a review of tree condition and site specific issues noted during a joint site inspection undertaken on 16 October 2023.

The proposed new design requires a number of existing trees to be translocated. The trees are to be moved in by November 2024. Six trees have been identified for translocation. The overall objectives of this report are to:

- To assess the subject trees in the current context and to update the baseline tree survey data (Nov 2021) as necessary.
- Provide an evaluation of the methods and requirements necessary to move the subject trees within the required timeframe.
- Provide aftercare requirements to maximise the successful re-establishment of the trees.

2 The Trees

The subject trees are identified as follows: See Appendix 1 for Tree Locations

Tree No.	Common Name	Stem Dia (mm)	Height (m)	Crown Spread (m)	Life Stage
T007	Cockspur Thorn	390	6.5	9.5	Mature
T045	Whitebeam	310	7	7	Early mature
T118	Hybrid Whitebeam	260	7	6	Semi mature
T119	Japanese Maple	m/s	4	5.5	Early mature
T120	Japanese Maple	m/s	4	5	Semi mature
T125	Silver Maple	330	9	7.5	Semi mature

2.1 Tree Condition

In terms of size and overall above ground condition, the subject trees are broadly similar to the recorded tree survey data (Nov 2021). Life stage has been modified for T118, T120 and T125 - changed from semi-mature to early mature. There are some minor changes in condition but nothing significant and as such the BS retention category has been amended due to changes in the immediate landscape and environment.

Tree No.	Common Name	Retention Category	Life Stage
T007	Cockspur Thorn	B2	Mature
T045	Whitebeam	B1	Early mature
T118	Hybrid Whitebeam	C1	Early mature
T119	Japanese Maple	C1	Early mature
T120	Japanese Maple	C1	Early mature
T125	Silver Maple	C1	Early mature

Previous groundwork, undertaken between the original tree survey and our most recent site assessment, has resulted in some potential changes to the rooting environment and revealed some useful anecdotal evidence. Each tree is described below.

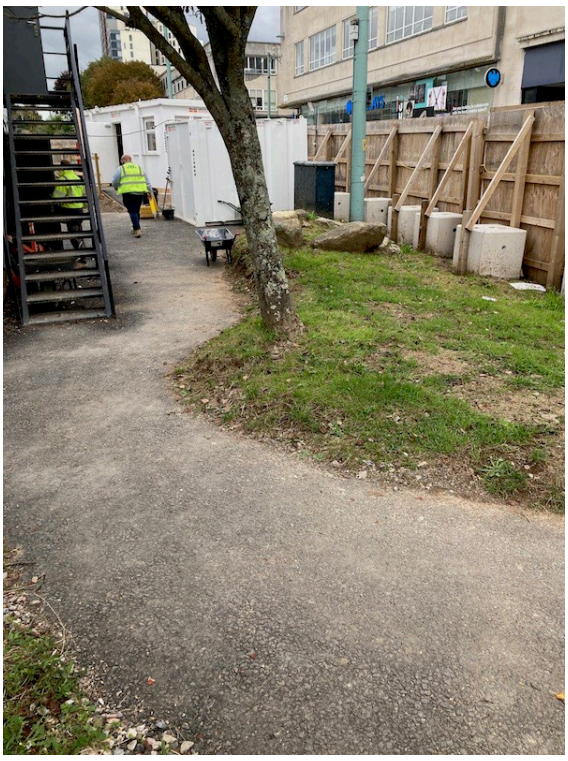
T007 Cockspur Thorn

This tree is surrounded on three sides by built infrastructure and growing in a raised area of landscape. The tree is generally in fair/moderate health. The tree has suffered a recent scaffold branch failure. The limb has split. There was no evidence of impact or mechanical damage, and it has most likely failed due to a combination of factors: over-extension, a weak attachment fork, and possibly a strong gust of wind. The tree does not have much inner foliage-bearing material through the crown, which limits its options for reduction pruning; this specimen is thus not the most tolerant of such pruning operations. The tree is mature in age and as such is likely to be more sensitive to any translocation operations. The crown size is 9.5m wide which will present physical challenges to its movement; this is exacerbated by the fact that over-extended scaffold branches are potentially delicate - as indicated by the recent branch failure. Due to these factors, although translocation is possible, further investigation is advisable to determine the most appropriate process to translocate this tree.

T045 Whitebeam

This tree is generally in reasonable health and fair condition. It was historically surrounded by other trees, with various elements of hard landscape in close proximity (now removed). The photograph on the right was taken in January 2023 after the removal of raised stone walls and hard surfacing.

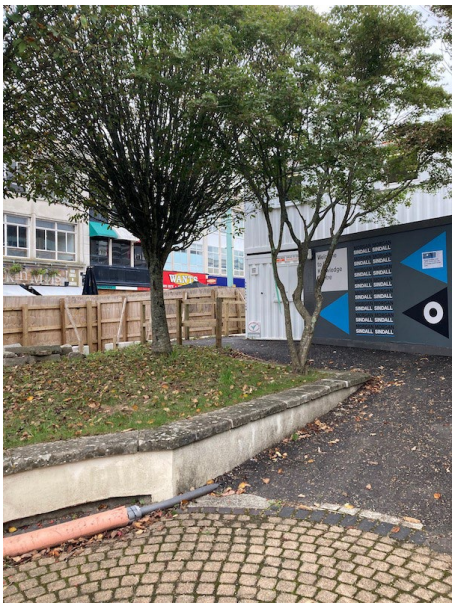
T118 Hybrid Whitebeam



This tree is generally in reasonable health and condition. It was historically surrounded with various elements of hard landscape in close proximity (now removed). The contractors office units and path have been installed following removal of the original hard landscape.

T119 and T120 Japanese Maple

These trees are generally in good health and fair condition. They are growing in restricted root space close to hard landscape. The photograph on the right is tree T119.



T125 Silver Maple

This tree is in reasonable health but particularly poor structural condition. It is a managed pollard in the hard landscape. There is a significant wound at the top of the stem following previous limb failure. Adjacent trees have recently been removed, leaving this tree exposed and at greater risk to branch loss. The pollard management regime will need to be maintained in any event.

3 Moving Trees

There are various methods and techniques used to translocate trees. Trees are dynamic organisms, intimately related to their environment. The success of translocating trees depends on a depth of understanding and an approach to limit the uncertainties. Preparation and method must be appropriate to each individual tree. Tree growth, form and function must be assessed on a case-by-case basis, however the key considerations are:

- Tree condition/tolerance - health, age and vigour.
- Root spread - form, extent and depth.
- Site access for machinery – enabling works and translocation operations.

3.1 Tree condition/tolerance

Studies have shown that healthy vigorous trees less than 30 cm (stem) diameter, root balled at three to five times stem diameter, are surprisingly tolerant to translocation. That also holds for larger trees, although the larger the tree, the greater the resultant stress.

Appropriately managed, the recovery from transplanting is likely within 4-5 years with good aftercare.

The subject trees have been evaluated and it is considered possible to translocate all the trees with the appropriate techniques' methodologies and aftercare in place. Further investigation has also been proposed to refine the preferred translocation methodology for each tree.

3.2 Root spread

There are unknowns relating to the actual extent of tree rooting. The actual location of roots may be unknown, however, the necessary information can be obtained during the translocation process, and specific tree requirements allowed for, by modifying the techniques used.

Image of typical tree rooting within an urban environment.

It is important to understand the functions of roots. The major functions are anchorage and water extraction, but the roots also function as a storage system for starch.

For trees which have the potential to be translocated, within the required timeframe, two key techniques have been identified, these are as follows:

3.3 METHODS OF TRANSLOCATION

Tree Spade

This option requires the use of a mechanical tree spade. These are generally mounted on the back of a six-wheel truck and usually operate a 2m diameter spade. The operation requires the truck to remove a plug of soil from the translocation area, which is then set aside for reuse. The tree spade is then positioned around the tree to be translocated, and hydraulic blades simultaneously cut out a plug containing a section of the root ball. The roots beyond the spade are severed during this operation. The tree is then transplanted within the already prepared pit where the first soil plug was removed. The soil plug is then relocated within the hole from which the tree was removed. Clearly if located off site, the trees will require transportation to the new location.

Truck mounted tree spade

Due to the site conditions, it is considered that this method will not be practicable due to the likely nature and depth of the urban soils along with access issues for the equipment required. It is also considered that, due to the age of the trees, the tree spade will not be able to extract sufficient root material for the successful translocation of the larger trees. This is also limited by the presence of existing hard surfacing and the planter retaining walls, that are in very close proximity to the trees.

3.4 Preferred Method - Air Spade And Tracked Excavator

The second, and preferred method of translocation, is through the use of the compressed air method e.g., Air spade or similar product in combination with a tracked excavator. The 'air spade' is used to expose the tree roots, which can then be cleanly cut, creating the root ball for translocation. Trenches are opened up at a distance of between 3-5 times the stem diameter and all woody roots pruned to define the extent of the root ball.

Radial trenches towards the tree will then be opened and the root ball undercut, whilst retaining as much soil and fine root material as possible. A framework will be secured as necessary to assist the lift. The root ball can then be wrapped with hessian and lifted with the excavator and translocated to a pre-dug tree pit.

Image of prepared root ball prior to lifting.

Image of excavator lifting root-balled tree

4 Considerations

4.1 Enabling works

Some enabling works will need to be carried out before translocation of any trees. These will include the removal of all barriers, including planters, bollards, cycle stands, boulders and potentially lighting bollards, from the existing and proposed translocation sites. The areas will need to be thoroughly investigated for live services and unknow below ground conditions. The areas will also need to be tracked, by the contractor, to ensure manoeuvres can be made. Preparatory investigations are also proposed through the use of an 'air spade', to establish the rooting condition and extent, to determine the appropriate detail for the translocation.

4.2 Timing

For best results, trees should be translocated during their dormant period, October – March.

4.3 Translocation Site

The translocation site will need to be reviewed and prepared prior to translocation. Before the start of the operation, the new tree location must be known, and tree pits must be pre-dug.

4.4 Conclusions for translocation method

Due to the potential unknown underground environment, including the potential for services, it is crucial that all operations are carefully planned, monitored and undertaken by skilled operatives.

The use of the compressed air method and excavator is considered the most appropriate translocation method for this city centre location.

5 Planting

All translocated trees are subject to stress, until a normal spreading root system has developed. That is why the primary objective of planting site preparation is to provide a good soil environment for the translocated trees. The quality of topsoil is a critical factor for the establishment and growth of the translocated tree. The suitability of soil on the site will be checked and appropriate samples analysed by a specialist for depth, structure, texture, and content.

To support healthy growth for the transplanted tree, the new tree pit is required to have a 500mm radius larger than the rootball. This is to be backfilled with a mix of:

- **backfilled topsoil obtained from around the existing tree (this is to provide some of the soil biology which the tree has developed and is used to back into the new planting environment).**
- **20% of PAS 100 compost (this is to provide additional nutrients and the help provide soil conditions conducive for the production of new roots).**
- **P4 granules (These are moisture retentive granules which can be used to regulate soil moisture levels within the soil).**
- **Biochar (This material helps maintain moisture and nutrient levels within the soil and can help the development of mycorrhizal fungi which are critical to tree health).**

The above specifications will be developed in accordance with the requirements of each individual tree location and soil conditions.

We will also install a tree irrigation system/pipe. By proactively installing a water supply system that will irrigate at the root ball, the tree's roots instantly receive the much-needed water to aid growth.

The **stabilisation** of the tree is required. This is done through the use of tree guy wires and or support props.

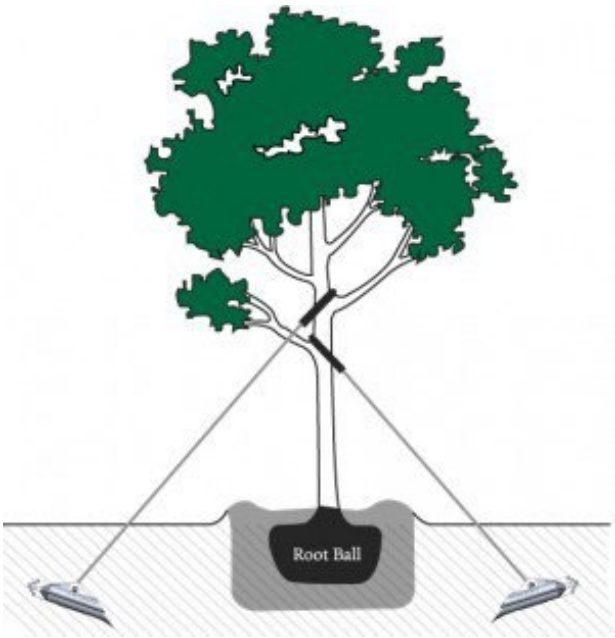


Image of guying system

Following guying the tree pit and the surrounding area should be treated with a mycorrhizal and soil bacterial drench, to aid the soil biology along with fertilisers, to aid establishment.

Mulch is required to be spread to the extent of the guys. This will consist of composted bark mulch to a depth of 100mm. This has a number of functions, from improving the soil condition and encouraging the soil biology to develop, along with retaining the moisture within the soil and releasing nutrients slowly back into the ground. Mulching to the extent of the guys also acts as a deterrent, reducing the risk of people walking into the wires.

Translocated trees will require an aftercare period of up to 5 years which will need to include:

- Watering
- Feeding
- Mulching
- Adjustment and final removal of guying system

The stress of a tree can be observed immediately after transplanting, or gradually, after a period of time. Proper care after transplanting will help to assure survival and minimise stress and ensure a higher rate of success. Maintenance is a continuation of the transplanting process. Effort and expense can be wasted if trees are not given proper care after transplanting.

If continued stresses and slackening growth are visible during the initial transplanting period, corrective actions will be adopted, before further decline of the tree. These are indicated below.

Watering

Sufficient and appropriate watering is important for proper root growth. Provision will be made for watering, allowing for total wetting of the rooting volume to minimise susceptibility to stress and assure survival.

Watering to be done to field capacity – a minimum 50 litres, every 3 days in dry periods, during the growing season (May-September). This is dependant on the size of the extracted root ball and soil conditions.

Mulching

Care should be taken to ensure that grass or weed growth does not compete with young root growth, by intercepting available water and nutrient supply. Care should also be taken to avoid the risk of damage to the stems of the trees from future strimming or mowing operations. An area with a radius, of at least to the extent of the guys, should therefore be kept free from competing vegetation by mulching, which should also prevent the need for mowing or strimming activities.

Mulch will also conserve soil moisture, buffer soil temperature extremes, control weeds and other competing vegetation, and will replenish organic matters and nutrients in the soil. A well-established layer of mulch can hold more water than the soil itself, without decreasing soil aeration. Mulch should not be placed too close to the tree trunk or root collar.

Guying

Initial guying will help retain a tree in an upright position until sufficient roots are developed to anchor the tree. Guys and stakes and ties will be removed, replaced, or adjusted as necessary to ensure their effectiveness and to prevent constriction or abrasion damage to the tree.

The supports can be removed after the tree establishment. Supports that stay too long without proper adjustment will do more harm than good to the trees.

6 Conclusions

Due to the age of the trees, and the likely stresses placed upon the trees following the translocation process, even with intensive aftercare there is a risk of the trees not surviving the translocation process.

Further ground investigations will be required for all trees and in particular tree 007 before the final translocation methodology can be finalised. The methodology is likely to vary for each tree and will be dependant on the findings of these investigations.

It is recommended that the trees are translocated using excavation with compressed air and removal with a tracked excavator.

ALL operations need to be planned and supervised by competent professionals. Tree pits require preparation in accordance with the recommendations within this report. Trees should be guyed to stabilise the root structure.

Aftercare will be adopted for up to 5 years, along with regular inspections to address any issues that arise during this period.

Appendix A

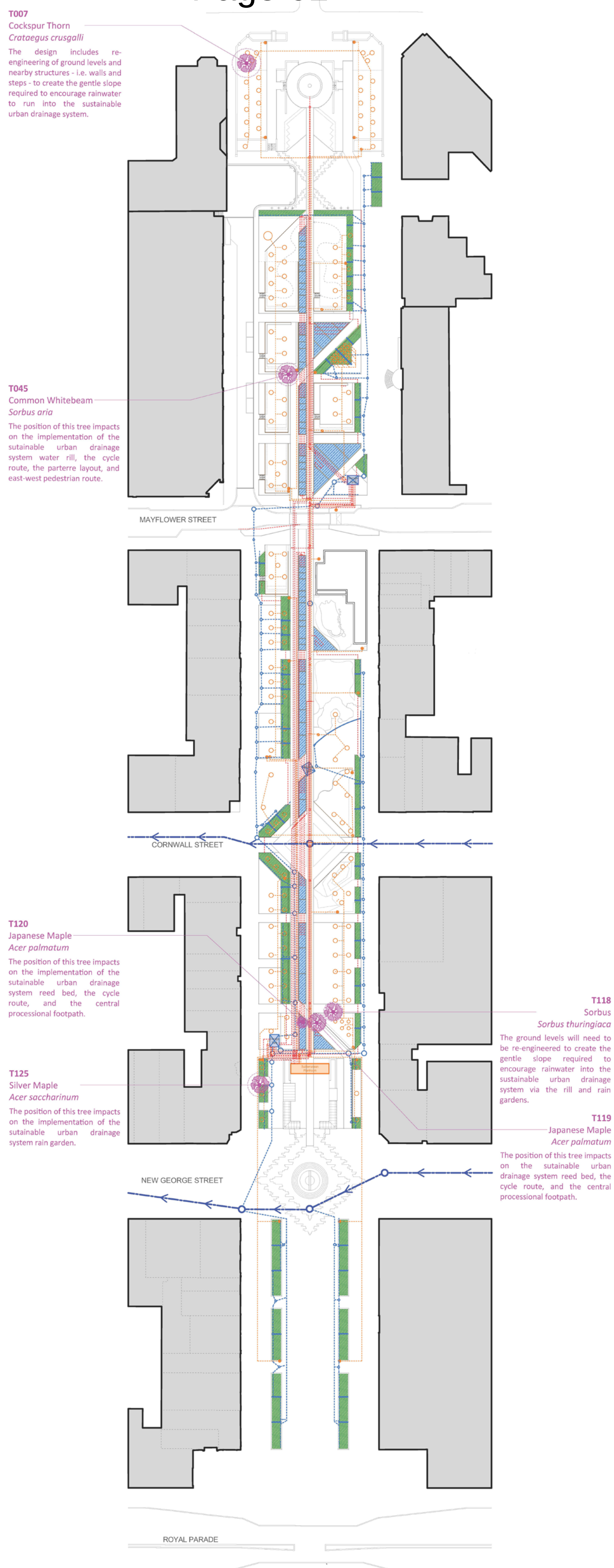
Tree Location Plan Provided By Studio Agora Architects

NOTES:

The following information represents an interpretation of specialist consultants information produced for the previous design layout which has been adjusted by Studio Agora to suit the revised proposal. As such the information depicted at this stage is INDICATIVE ONLY and subject to disrepancies and further development following the completion of the public consultation.

The schematic is specific to the proposed new Sustainable Urban Drainage System (SUDS) being proposed for Armada Way, as such the existing below ground drainage routes and other service routes have been omitted for improved legibility.

INDICATIVE SCHEMATIC ONLY



LEGEND

- Existing trees for off-site translocation (Root Protection Areas shown)
- Proposed new raingardens to catch surface rainwater
- Proposed new water rill and reed beds to catch, filter & distribute surface rainwater
- Proposed below ground surface water drainage collection network
- Proposed below ground tree irrigation network (and water points)
- Proposed below ground rill, reed bed and raingarden connecting pipework
- Below ground water storage tanks
- Subterranean plant room to house pumps for SUDS system
- Proposed connection route of wider strategic storm water drainage system

GENERAL NOTES

Check all dimesnions on site. Do not scale from this drawing. Report any discrepancies and omisisons to Studio Agora Architects.

DESIGN/SKETCH DESIGN

Unless stated otherwise th4e desings shown are subject to detailed site survey investigations and legal definition the CDM Regulations and the comments and/or approval of the variou relevant Local Authority Officers Statutory Undertakers - Fire Officers Engineers and the like. They are copyright project specific and confidential and no part is to be used of copied in any way without the express consent of Studio Agora Architects.

AREA CALCULATIONS

The areas shown are approximate only and have been measured off preliminary drawings as the likely areas at the current state of design using the stated option from the Code of Measuring Practice 4th edition (RICS/ ISVA). These may be affected by future design development and construction tolerances or the result of surveys for existing buildings. Take account of these factors before planning any financial or property development purpose or strategy and seek confirmation of latest areas before decision making.

3RD-PARTY INFORMATION

This drawing includes information provided by independent surveyors and/ or consultants to whom all enquiries shall be made. Studio Agora Architects accept no liability for its content or accuracy.

Client:

PLYMOUTH CITY COUNCIL

Rev	Comment	Date	By	Chk
P01	PRELIMINARY ISSUE FOR COMMENT	26.10.2023	DC	LF
P02	WIDER STRATEGIC STORM WATER CONNECTION ADDED	26.10.2023	DC	LF
P03	FURTHER ANNOTATION ADDED	30.10.2023	DC	LF
P04	UPDATED TO PCC COMMENT	31.10.2023	DC	LF
P05	TREE T125 LATIN NAME AMENDED	01.11.2023	DC	LF

Internal Project Number:

22101

Project:

ARMADA WAY PUBLIC REALM, PLYMOUTH

N

Drawing Number:

67CA09-STA-ZZ-XX-SK-L-XXXX-016

rathbonepartnership
chartered landscape architects

Drawing Title:

PROPOSED INDICATIVE SUDS SCHEMATIC vs. EXISTING TREES FOR TRANSLOCATION - ALL ZONES

Scale @ A0:	Date Drawn:	Drawn by:	Checked by:	Suitability:	Revision:
1:500	26.10.2023	DC	LF	D2	P05

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