

A66 Northern Trans-Pennine Project TR010062

7.25 Tree Loss and Compensation Planting Report

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7.25 TREE LOSS AND COMPENSATION PLANTING REPORT

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1 Introduction

1.1 Background and Purpose

- 1.1.1 This Tree Loss and Compensation Planting Report provides an estimate of the numbers of trees lost as well as an estimate of the quantity of tree planting provided as part of the mitigation across the A66 Northern Trans-Pennine (NTP) Project between M6 Junction 40 at Penrith and the A1 junction at Scotch Corner (the Project). It responds to a request made by the Examining Authority (ExA) at Issue Specific Hearing 2 (ISH2) Agenda Item 3.5 and addresses the Deadline 1 Submission 7.3 Issue Specific Hearing 2 (ISH2) Post Hearing Submissions (REP1-009) commitment.
- 1.1.2 At ISH2 the ExA requested that supplementary information was to be provided on the trees impacted by the Project including identifying the location of tree losses, the total number of trees lost and the approximate location and level of replacement tree planting as part of the environmental mitigation.
- 1.1.3 The purpose of this report is to set out the tree baseline information, quantifying the total number of trees which could be lost to the Project and subsequently determining and setting out the level of trees which could be required to be replanted as part of the environmental mitigation. This is summarised in section 4 and 5 of this report.
- 1.1.4 This report must be read in conjunction with the following figures, which are appended to this document:
 - Figure 1: Tree Constraints Plan
 - Figure 2: Woodland Habitat Removal
 - Figure 3: Woodland Habitat Replacement
- 1.1.5 Within the Environmental Management Plan (EMP) (DCO Document Reference 2.7 / APP-019) commitments have been included to ensure that tree removal is kept to a minimum and that at the detail design stage there must be more detailed inspections undertaken and tree protection measures (ref. D-LV-01, D-LV-02 and D-LV-04). The subsequent surveys must be in line with the British Standard BS5837:2012: Trees in Relation to Design, Demolition and Construction Recommendations which detail the steps that should be taken to ensure trees are appropriately and successfully retained when development is taking place.
- 1.1.6 In order to comply with BS5837:2012, an Arboricultural Impact Assessment (AIA) must be undertaken, and will comprise the following: a detailed tree survey, tree protection plan and arboricultural method statement.
- 1.1.7 A detailed tree survey must be based on a detailed topographical survey combined with detailed site inspections of both individual trees and groups of trees (woodlands) that fall within the development or within close proximity. This survey would identify the tree species, height, stem diameter taken 1.5m from ground, branch spread, height of crown, age class, physiological condition, structural condition, preliminary



- management requirements, estimated safe useful life expectancy and category grade as per BS 5837.
- 1.1.8 Following a detailed tree survey a tree protection plan would be produced to scale which would comprise existing and proposed buildings or structures, all retained trees on and adjacent to the scheme with corresponding Root Protection Areas and crown spread, the location of protective fences or barriers (with details of how these are to be constructed), proposed location of all plant and material storage, drainage runs, roads, existing and new accesses, and any other surface or underground features which may affect the trees.
- 1.1.9 Finally, an arboricultural method statement will be required if construction is required within the root protection areas or if any part of development process is likely to affect any trees to be retained. This will include construction method statements and methodologies for the implementation of any aspects of the development that may have the potential to result in the loss of or damage to a tree, and explains how this damage will be avoided.



2 Methodology

2.1 National Tree Map Dataset

- 2.1.1 In order to assess the numbers of trees lost, a geographic information system (GIS) calculation has been undertaken using the BlueSky's − National Tree Map™ (NTM) dataset¹, by extrapolating the number of trees that are within and directly adjacent to and including trees within a 2 metre offset of the Indicative Site Clearance Boundary (Document Reference 3.3 Figure 2.2 / APP-062). An assessment of both the NTM dataset and a comparison between the areas of woodland recorded by the biodiversity Phase 1 habitat surveys (Document Reference 3.4 / APP-156) has been undertaken to ensure the accuracy of tree numbers.
- 2.1.2 As stated in Chapter 2 of the ES (Document Reference 3.2, APP-045), the Indicative Site Clearance Boundary is derived from the indicative scheme design and the indicative construction working areas, and is used in the assessment as a reasonable worst case assumption for the extent of vegetation and top soil clearance. The remainder of the Order Limits (Document Reference 3.2 / APP-045) is land included for environmental mitigation, and therefore it is assumed that important receptors (e.g. hedgerows, mature trees) will be retained in this area.
- 2.1.3 At the time of writing this report, the final design has not been fixed, and the parameters of the proposals are subject to change. Therefore, all trees within the Indicative Site Clearance Boundary have the potential to be impacted. Therefore, as a worst-case scenario, it has been assumed that all trees within this area will be lost, as per Chapter 10 of the ES (Document Reference 3.2 / APP-053).

Root Protection Area

2.1.4 Individual trees have been identified using the most recent NTM dataset available at the time of writing this report. The root protection area (RPA) has been illustrated by an offset from each individual tree crown as shown in Figure 1 of this report, Tree Constraints Plan. The RPA has been calculated by multiplying the radius of the crown three times and to a maximum of 15m (in accordance with British Standard BS5837:2012 – 'Trees in relation to design, demolition, and construction – Recommendations'). Where the RPAs intersect with the Indicative Site Clearance Boundary those trees have been identified as being lost. Refer to Figure 1 Tree Constraints Plan which shows the trees identified and their indicative root protection areas.

Figure 1 Tree Constraints Plan (Please refer to Appendix 1)

2.1.5 The approximate position of the trees which are potentially impacted by the Project and assumed as being lost are indicated in Figure 1 Tree Constraints Plan, including those that intersect with the 2m offset from the Indicative Site Clearance Boundary. This plan is not to scale and

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represents the approximate physical parameters of the trees using the NTM dataset.

2.2 Review of Existing Survey Information

Figure 2 Woodland Habitat Removal (Please refer to Appendix 2)

- 2.2.1 Areas of woodland were identified by aerial photography and subsequently ratified by site survey (Phase 1 Habitat survey Document Reference 3.4 / APP-156). The types of woodland and species mix have been noted in Table 6.20 of ES Chapter 6: Biodiversity (Document Reference 3.2 / APP-049). This survey data is copied across and presented in Figure 2 of this report which illustrates the woodland habitat removal.
- 2.2.2 A survey was also undertaken to identify notable and veteran trees. These are shown on ES Figure 6.2 Ancient Woodland, Ancient Tree Inventory and Habitats of Priority Importance (Document Reference 3.3 / APP-070), as are all trees subject to a Tree Preservation Order (Document Reference 5.24 / APP-378, APP-379, APP-380). This survey data is also copied across and presented in Figure 2. As stated in Chapter 2 of the ES and commitments D-LV-01, D-LV-02 and D-LV-04 of the EMP and illustrated on the Mitigation Maps (Document Reference 2.8, APP-041), important landscape receptors e.g. mature trees and trees with Tree Preservation Orders will be retained as far as reasonably practicable.

Figure 3 Woodland Habitat Replacement (Please refer to Appendix 3)

2.2.3 Compensation planting areas have been identified with the landscape element code noted, species mixes and density can be found within the Landscape and Ecology Management Plan (LEMP) (Document Reference 2.7 / APP-021). An average planting density of 1.5 metre centres (approximately 1 plant every two square metres) has been applied within the LEMP, giving a resulting total of trees to be planted. Refer to Figure 3 of this report which maps the approximate location of woodland habitat replacement.

2.3 Data Analysis

- 2.3.1 The findings and data collected for this assessment have been represented both in tabulated format and through GIS mapping. These sources of information should be read in conjunction with one another; the data collected is presented in section 4 of this report (Tables 4-1 to 4-3) and the GIS mapping has been presented on Figures 1 to 3 appended to this report.
- 2.3.2 Data gathered from the NTM, presented in Table 4-1 and illustrated in Figure 1 has been used to identify the impacts that the Project will have on individual trees.
- 2.3.3 Data gathered from site surveys, presented in Table 4-2 and illustrated in Figure 2 has been used to identify the impacts the Project will have on woodland habitats and the area of tree losses.
- 2.3.4 Data gathered from the Mitigation Maps and densities set out in the LEMP presented in Table 4-3 and illustrated in Figure 3 has been used to identify



- the approximate total area and total number of replacement tree planting as part of the environmental mitigation.
- 2.3.5 This assessment can be taken forward to inform the detailed design process as well as feed into the detailed tree surveys and arboricultural impact assessments to be undertaken during detailed design.



3 Assumptions and Limitations

- 3.1.1 This report does not constitute an arboricultural impact assessment. Where concerns for tree health and safety exist the necessary and appropriate tree inspections should be carried out at the detailed design stage.
- 3.1.2 This report does not constitute an ecological assessment of the trees and the Project. A separate Phase 1 habitat survey has been carried out and a report produced in Chapter 6 Biodiversity within the ES (Document Reference 3.2 / APP-049), the findings from this survey have been illustrated on Figure 2 of this report (Woodland Habitat Removal) and have informed this supplementary assessment.
- 3.1.3 The approximate physical parameters for the trees have been defined by the NTM dataset and are an estimate based on their aerial photography and Light Detection and Ranging (LiDAR) remote sensing data. NTM is a digital map layer and database accurately depicting and recording the location and extent of trees. NTM details the spatial location and height of individual trees, together with the crown circumference.
- 3.1.4 The maximum and average heights of the crown and the size of the crown of each tree are calculated automatically using robust algorithms applied to a range of geographic data, including aerial photography, colour infrared, LiDAR, and digital surface models.
- 3.1.5 The data itself comes with three layers, one showing the actual outline of the tree canopy as an irregular vector polygon. This has then been interpolated as a circle with the same area, which can be used for illustrative purposes, and the final layer is a simple point file which displays a point at the position of the highest point of the tree. All three layers are attributed with several metrics relating to the tree, including maximum and average height as well as the area of canopy coverage.

Table 3-1: BlueSky - National Tree Map™ Specification

Specification Specification		
Layers	1.Canopy Polygons (Vector Polygon) – Representing individual trees or closely-grouped tree crowns 2.Idealised Crowns (Vector Polygon) – Crown polygons visualised as circles for ease of use 3.Height points (Vector Point) – Detailing the centre point and height of each canopy feature	
Coverage	England, Wales & Scotland	
Accuracy Z	± 1m Root Mean Square Error (RMSE)	
Classification Criteria	Trees over 3m in height	
Formats	Include: ESRI Shape & MapInfo, Geodatabase, DWG, KMZ	
Standard Projection	British National Grid	

3.1.6 The conclusions and recommendations in this report are recommendations based on GIS datasets and are not an assessment of tree quality, value or health. The NTM dataset is, as explained above, limited to aerial photography and LiDAR data, meaning there is a margin for error and the dataset may not include all of the trees found on site.



4 Results

4.1 Tree Constraints Plan (NTM Dataset)

- 4.1.1 The findings of this assessment are presented in Tables 4-1, 4-2 and 4-3 below:
- 4.1.2 Table 4-1 should be read in conjunction with Figure 1 Tree Constraints Plan.

Table 4-1: Trees within Indicative Site Clearance

Туре	Number of trees lost
Individual Trees – NTM dataset (Total Number of Trees Lost)	18,255
Veteran and Notable (Included within NTM dataset total)	4
Individual tree -Tree Preservation Order (TPO) (Included within NTM dataset total)	5
*Tree Preservation Order group (Included within NTM dataset total)	*18

^{*}Number of trees impacted within the TPO group has been quantified using the NTM dataset.

- 4.1.3 The information presented in Table 4-1 illustrates the number of trees located within the Indicative Site Clearance Boundary using the NTM dataset, refer to Figure 1 of this report (Tree Constraints Plan).
- 4.1.4 The NTM dataset is supplemented with the dataset from the notable and veteran tree survey completed for the project (Document Reference 3.3 / APP-070). The TPO group information was taken from local councils' datasets and from a portion of the total number of trees identified as being impacted, using the NTM dataset to quantify the trees. Tree removal must be kept to a minimum, which has been secured through commitments within the EMP as discussed in paragraph 1.1.5. TPO trees have also been highlighted for retention within the Mitigation Maps.
- 4.1.5 It is worth noting that the NTM data will not capture every tree for example when a tree is located underneath another trees canopy and so this number will naturally be lower, however, it gives a good indication of the number of trees within the Indicative Site Clearance Boundary.

4.2 Woodland Habitat Removal

4.2.1 Table 4-2 should be read in conjunction with Figure 2 Woodland Habitat Removal.

Table 4-2: Area of woodland habitat types within Indicative Site Clearance

Туре	Area of tree loss (m²)
Broadleaved Semi-natural Woodland	77797.67
Broadleaved Plantation Woodland	125099.9
Coniferous Plantation Woodland	81950.7
Mixed Semi-natural Woodland	20476.46
Mixed Plantation Woodland	164675.5
Dense/Continuous Scrub	58859.26
Scattered Scrub	3421.44
Broadleaved Parkland/Scattered Trees	4393.78
Total area of tree loss (m²)	537729.2



4.2.2 The information presented in Table 4-2 is the area of each of the phase 1 woodland habitat survey types within the indicative site clearance boundary, giving a total area of potential woodland loss, as well as a breakdown of the types of woodland lost.

4.3 Woodland Habitat Replacement

4.3.1 Table 4-3 should be read in conjunction with Figure 3 Woodland Habitat Replacement.

Table 4-3: Compensation Planting

Landscape Element Code	Environmental Tree Planting Mitigation	Area (m²)
LE2.1	Woodland	1,086,586.23
LE2.2	Woodland Edge	577,925.22
Total area of trees planted		1,664,511.45

4.3.2 The information presented in Table 4-3 illustrates the areas of environmental mitigation that include tree planting within the Order Limits, refer to Figure 3 of this report (Woodland Habitat Replacement) which illustrates the approximate location of woodland mitigation areas.

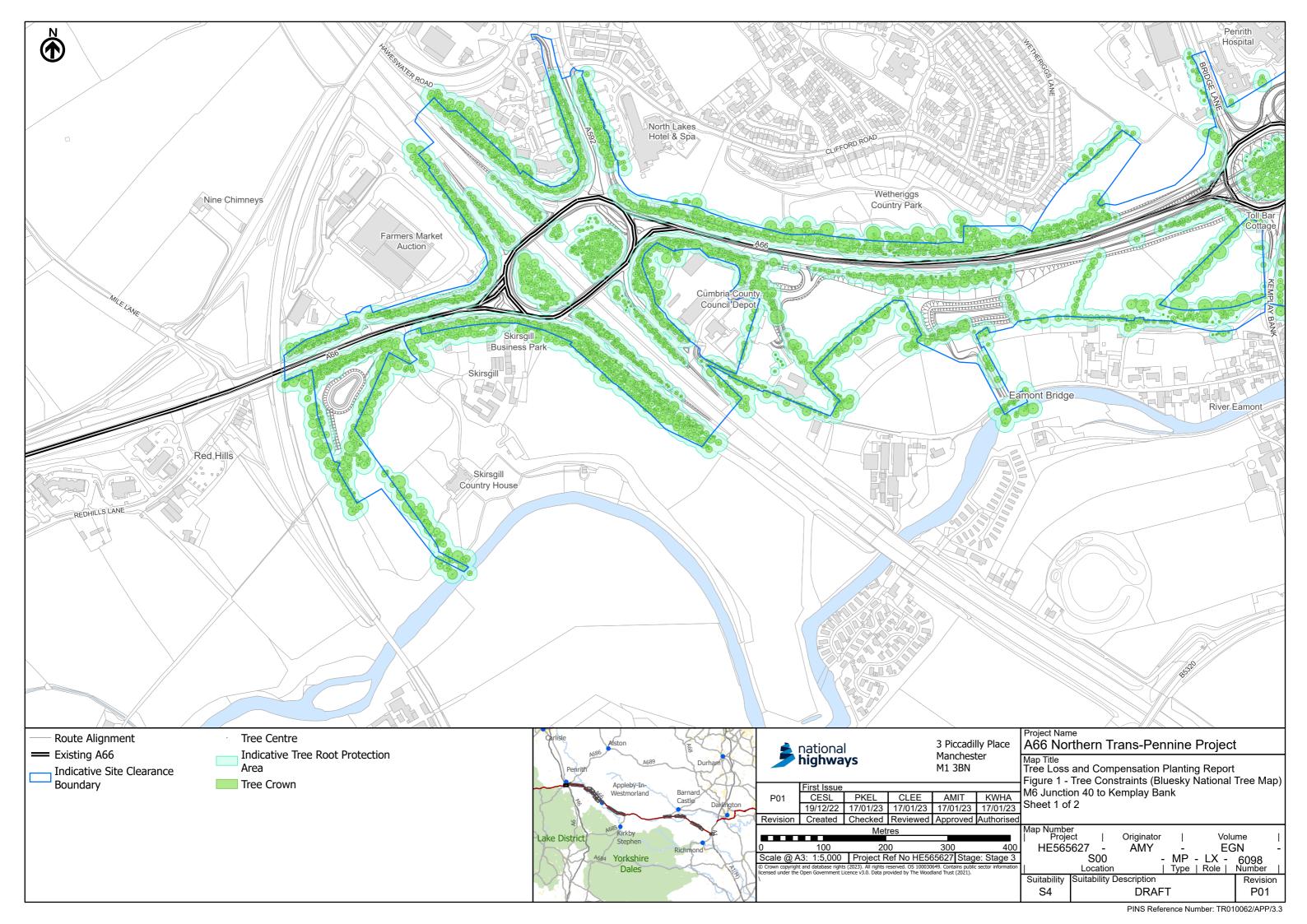


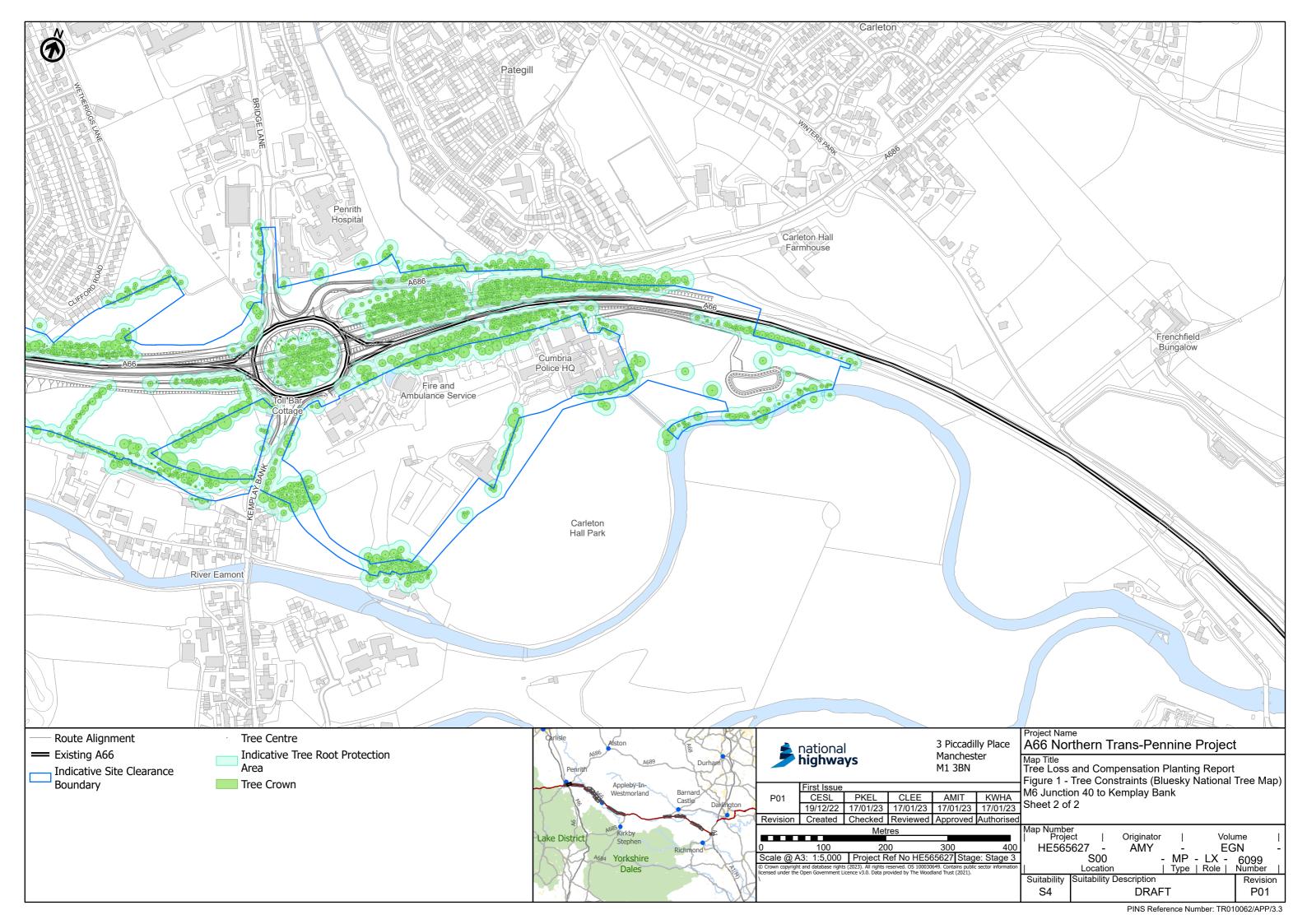
5 Conclusion

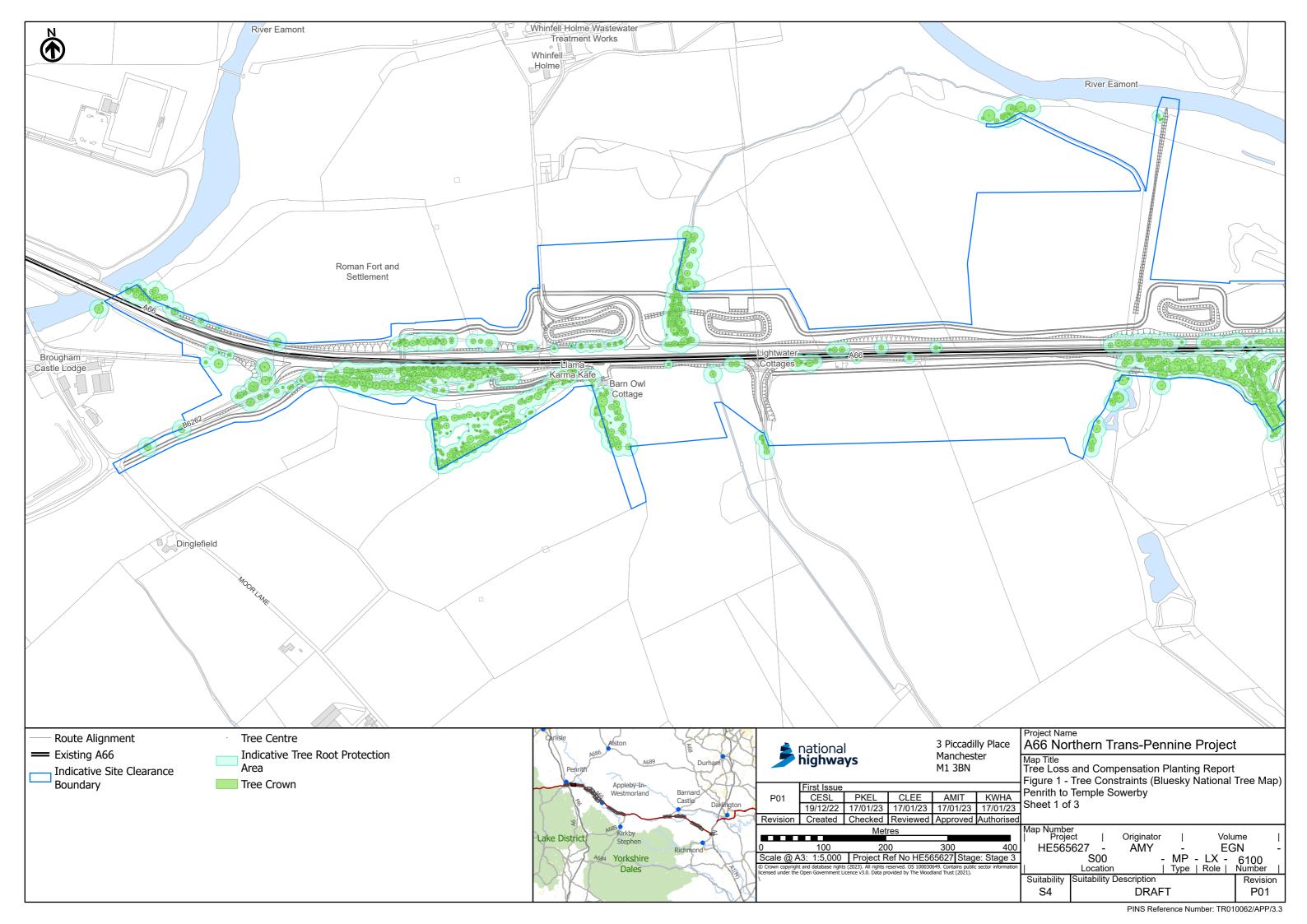
- 5.1.1 Within the Indicative Site Clearance Boundary (including 2m offset) the total number of trees lost is approximately 18,255 (refer Table 4-1). The total area of tree loss is approximately 53 hectares (537,729.2 m²) (refer Table 4-2) and the total area of tree planting as part of the overall environmental mitigation is approximately 166 hectares (1,664,511.45 m²)(refer Table 4-3). This means that across the Project there is an increase in tree planting (woodland habitat replacement) by an area of 112 hectares (1,126,782.25 m²).
- 5.1.2 The replacement planting requirements are secured in the first iteration EMP (Document Reference 2.7 / APP-019) in various commitments. The relevant replacement ratios for habitats has been included as a commitment (D-BD-05) for an environmental mitigation scheme submitted to the Secretary of State for approval as part of a second iteration EMP, to reflect the requirements for habitat replacement as set out in ES Chapter 6: Biodiversity Table 6-20: Areas of habitat loss and mitigation. Commitment D-LV-04 (tree replacement ratio) sets out tree replacement at a minimum planting ratio of at least two trees planted for every one tree removed (2:1). The Order limits (Document Reference 3.3 / APP-064) have been set having regard to the need to accommodate the environmental mitigation requirements.
- 5.1.3 Two trees planted for every one tree removed (2:1), as a planting ratio, is common good industry practice and a policy that many local planning authorities prescribe. It helps to further incentivise the retention of trees during the development of any project which is why this commitment has been included within the EMP (refer to paragraph 5.1.2).
- 5.1.4 Densities of woodland mitigation planting will vary across the Project due to a number of factors. Planting densities can vary due to the mitigation purpose, for example, within the LEMP any LE2.1 Woodland mitigation planting that has been proposed for landscape integration (EFB) purposes, has been prescribed at an average density of 1.5m centres (1 plant every two square metres)(refer Document Reference 2.7 / APP-021 paragraph B1.10.4).
- 5.1.5 As prescribed in the ES, The total area required to replace the tree losses can be achieved within the Order Limits and to the minimum replacement ratio of 2:1 (two trees planted for every one lost). This is summarised in paragraphs 5.1.1 and 5.1.3 which draw upon results of this assessment shown in tables 4-1, 4-2 and 4-3.

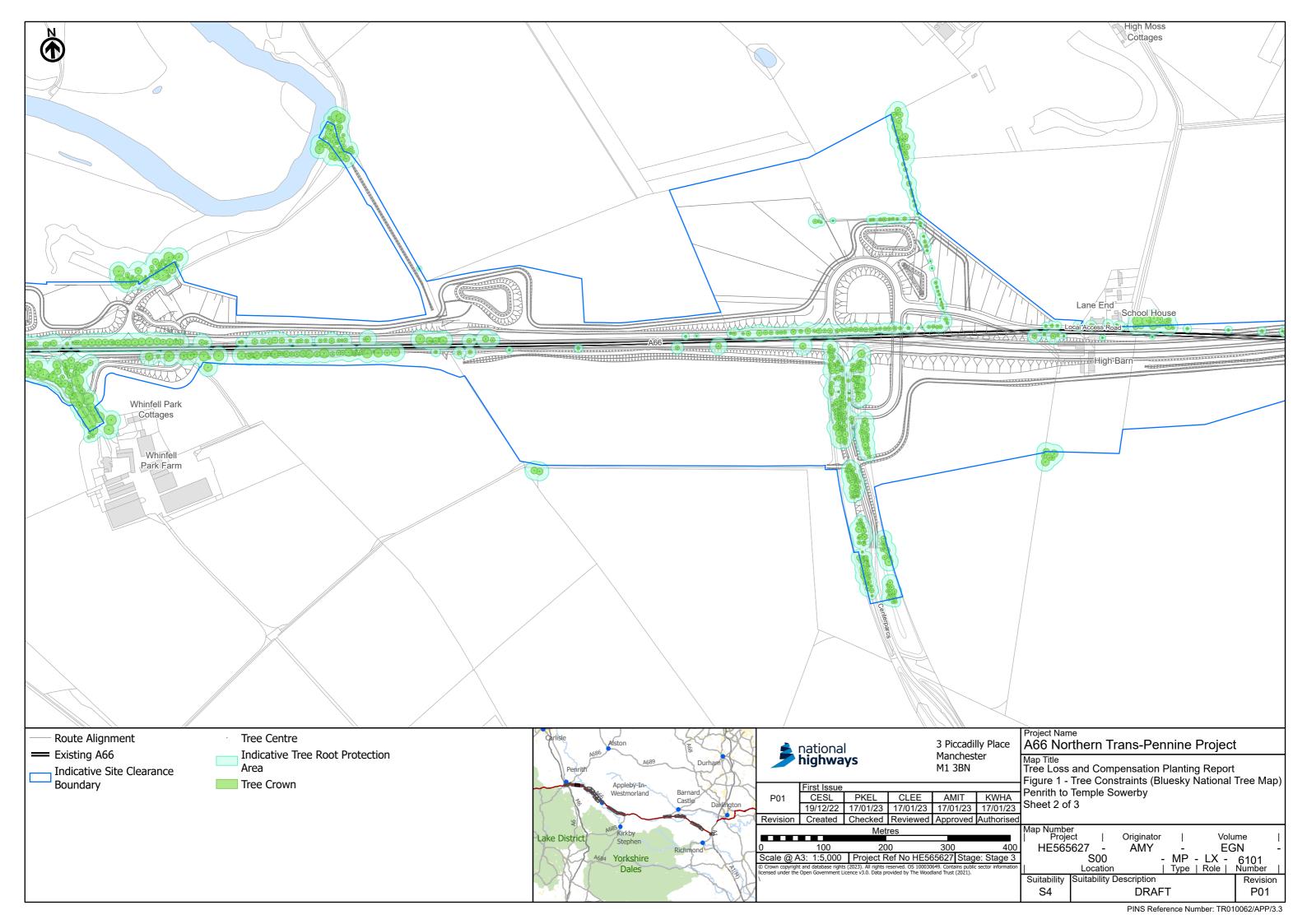


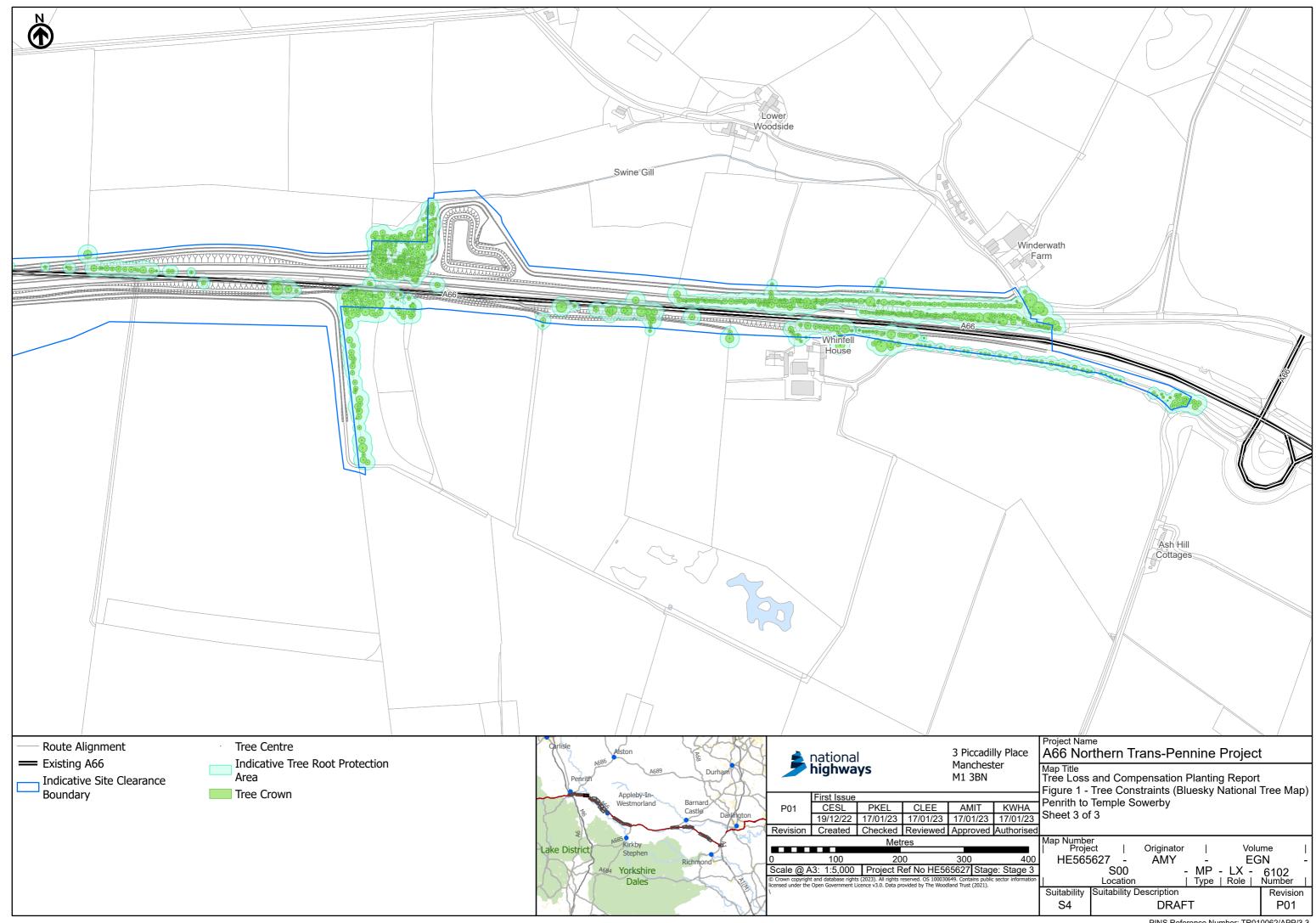
Appendix 1: Figure 1 – Tree Constraints

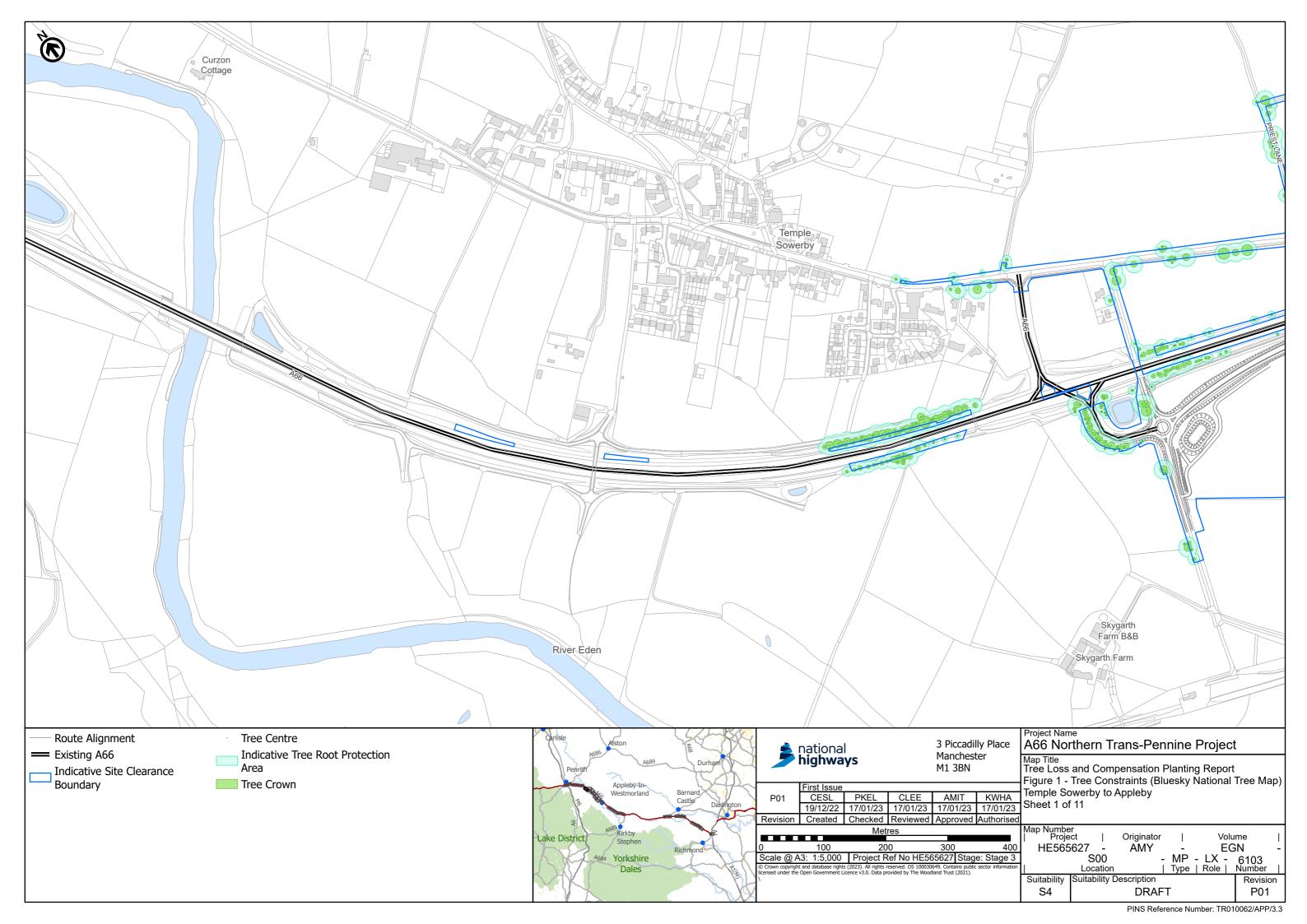


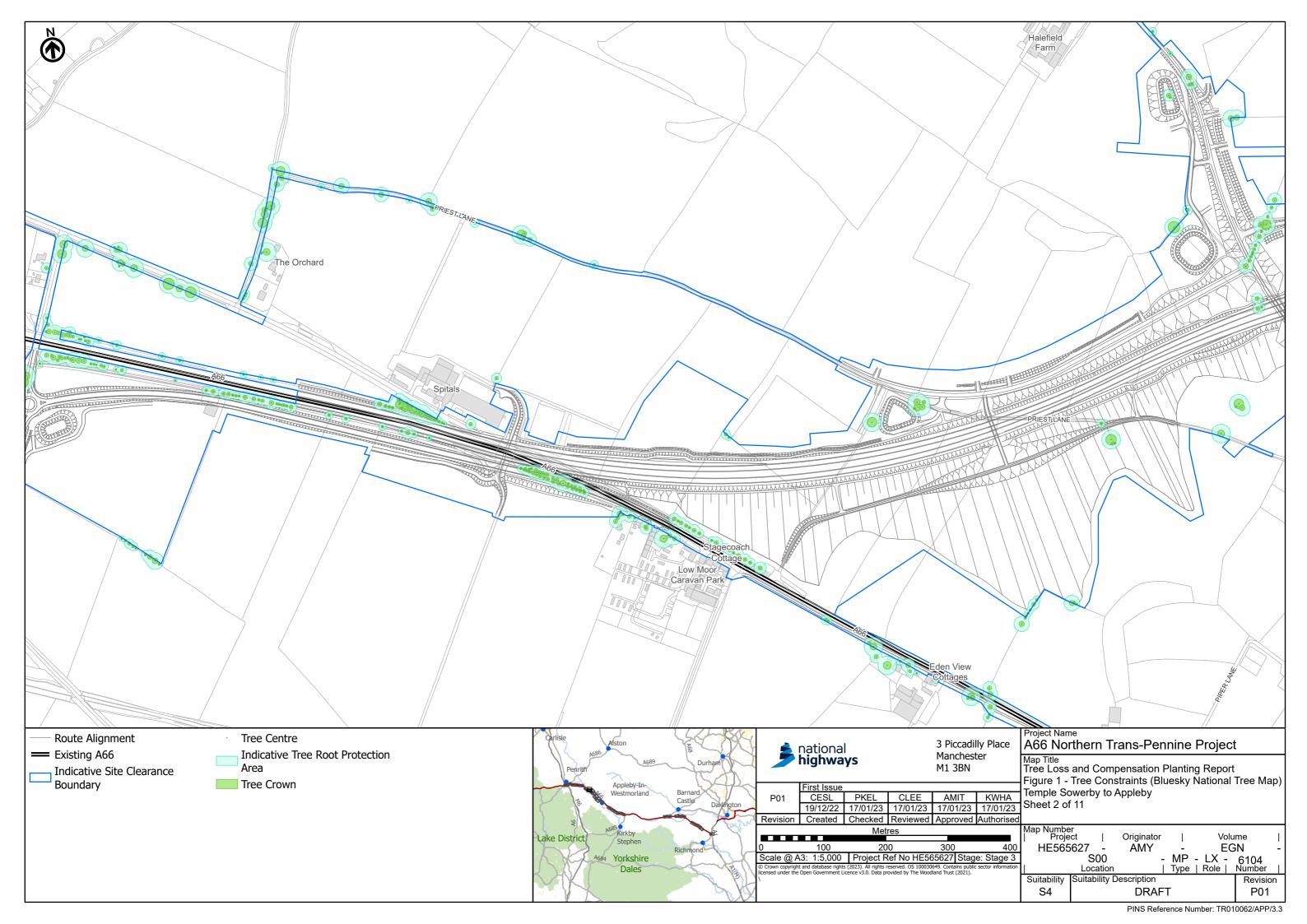


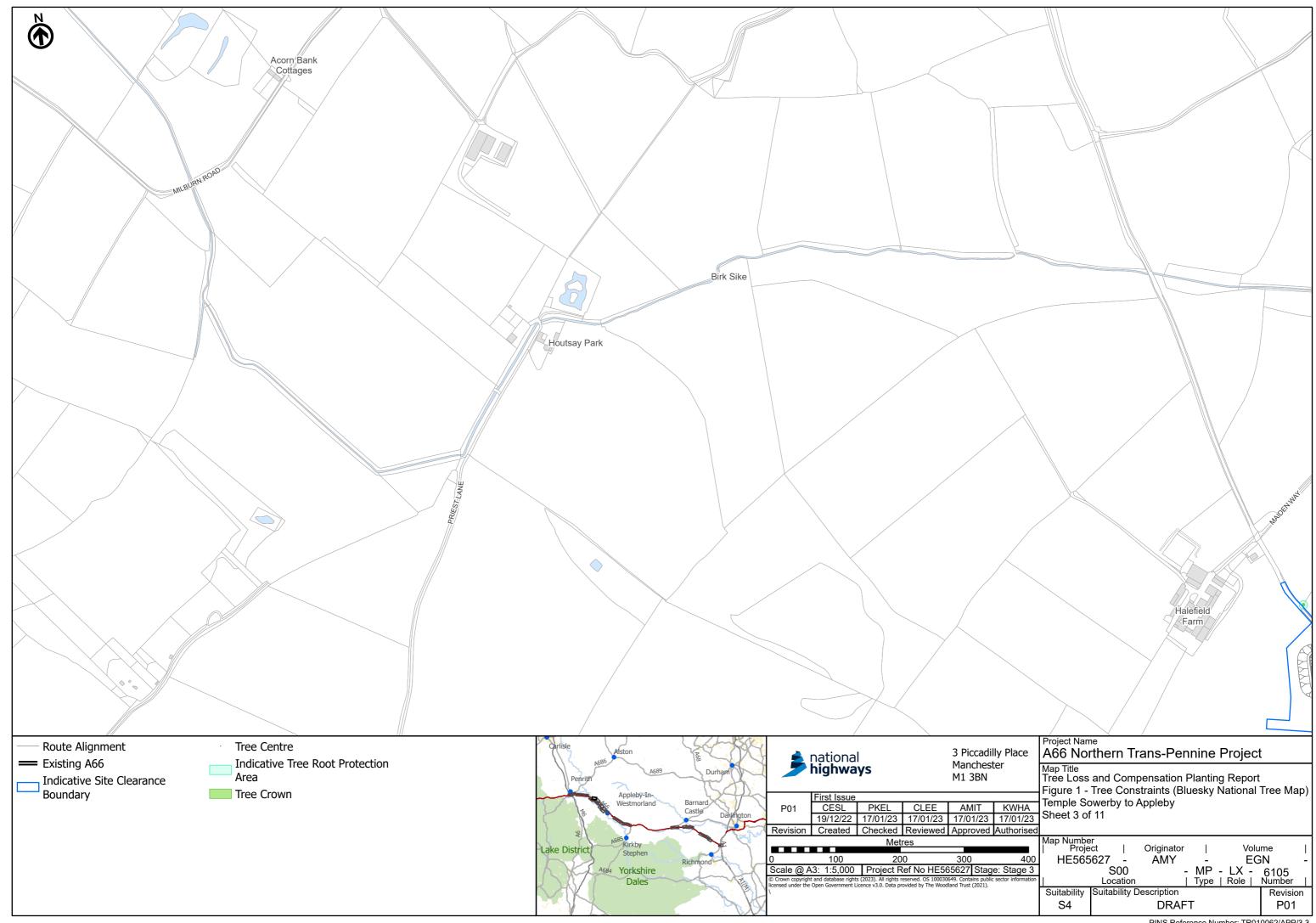


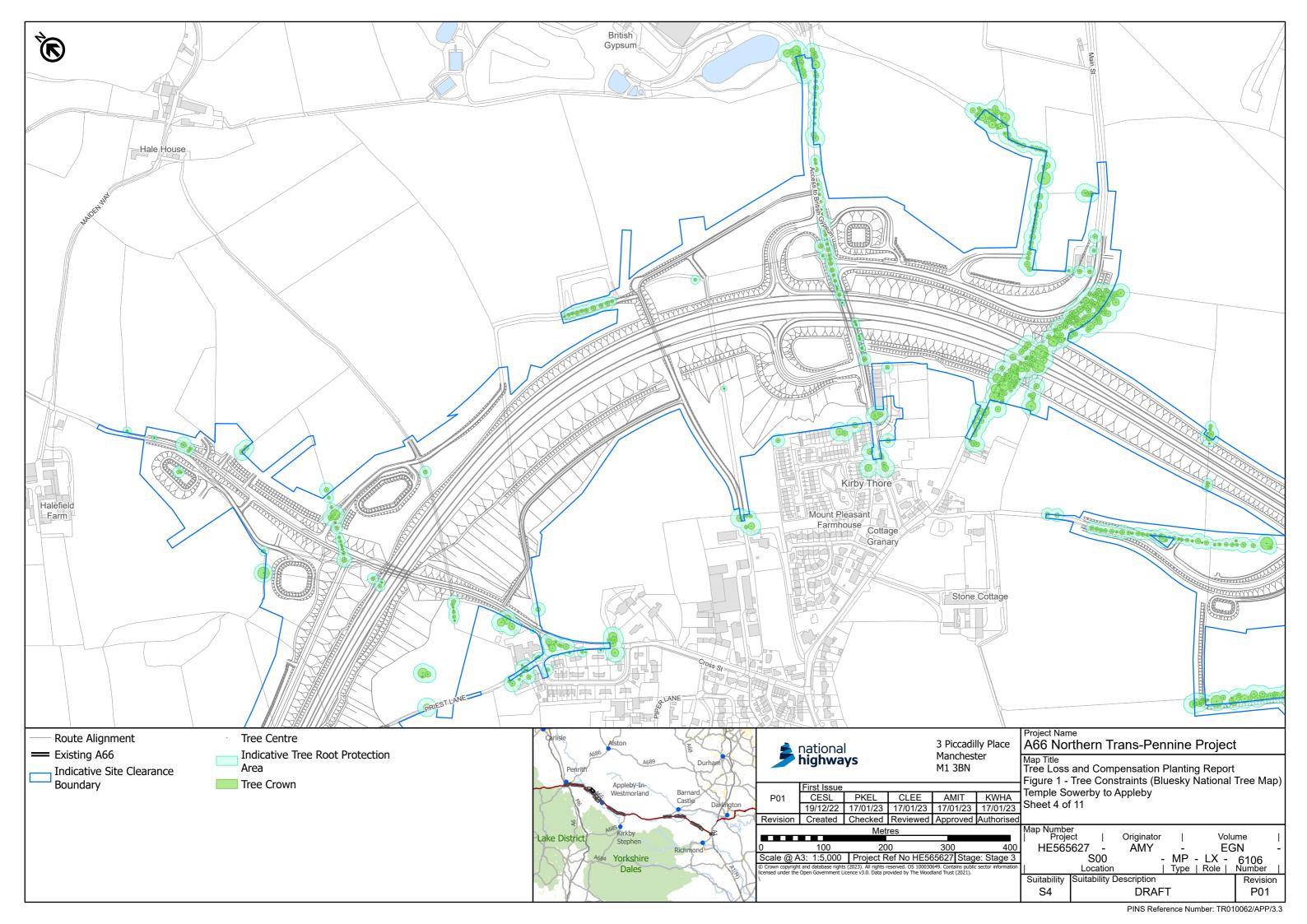


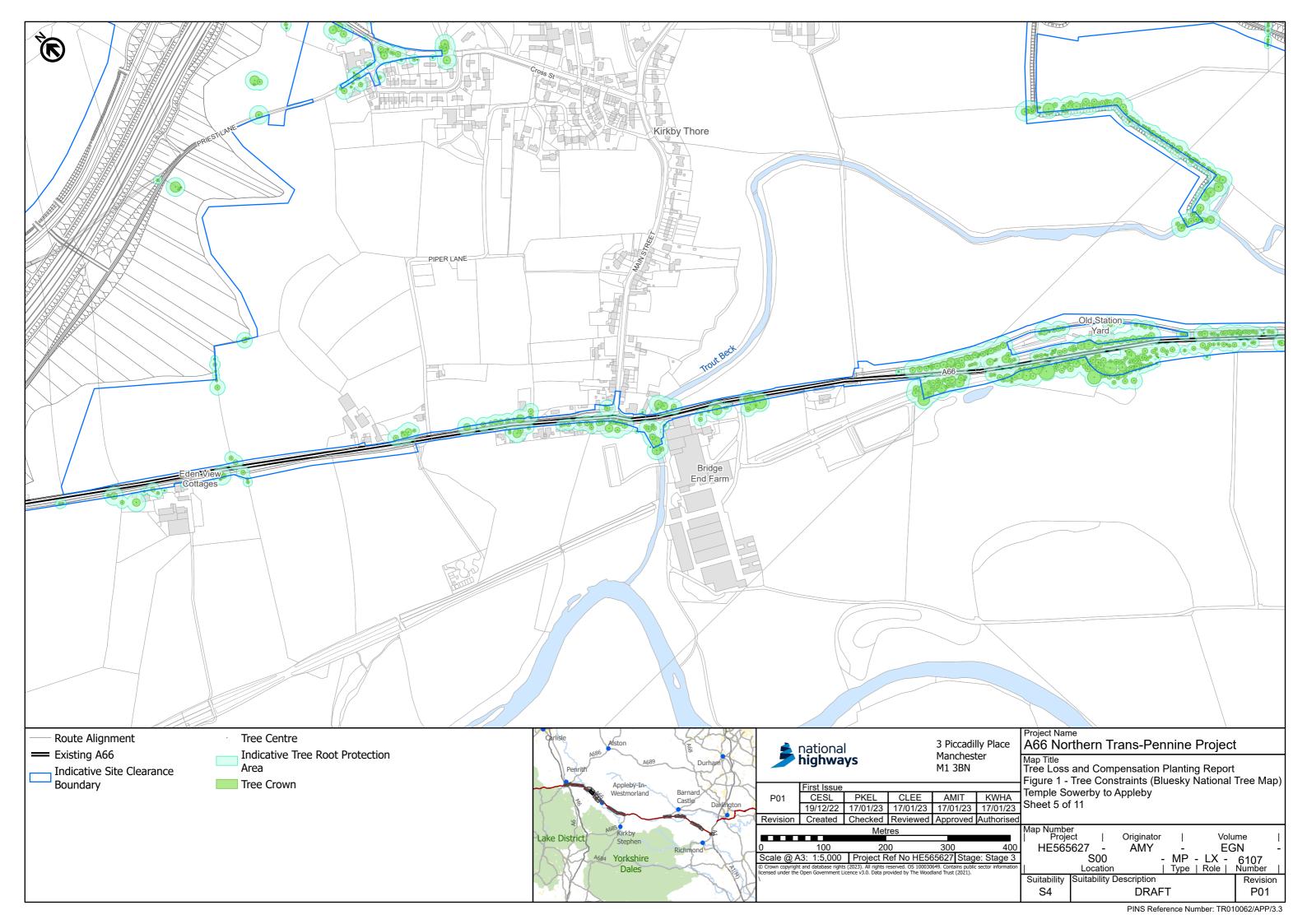


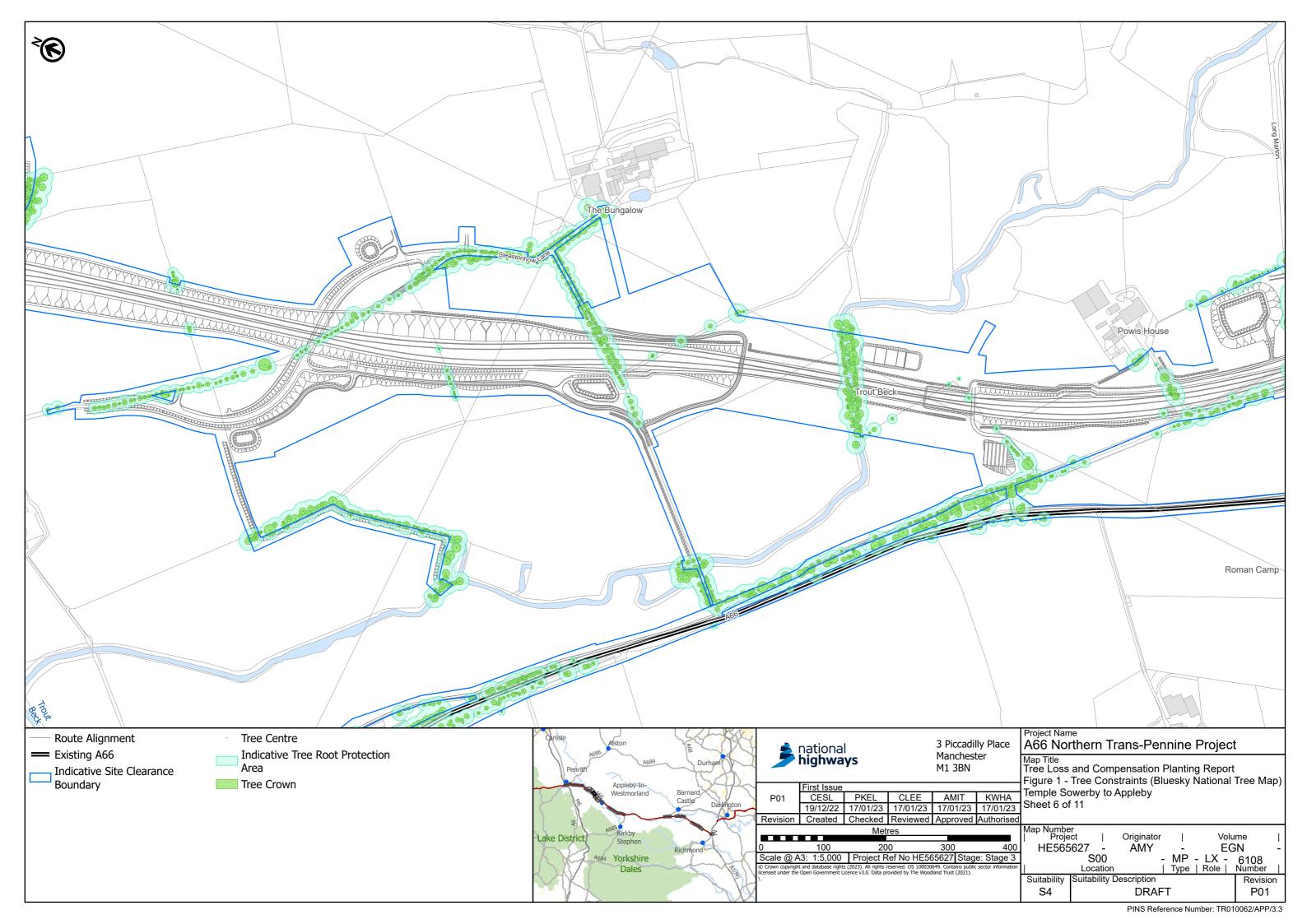


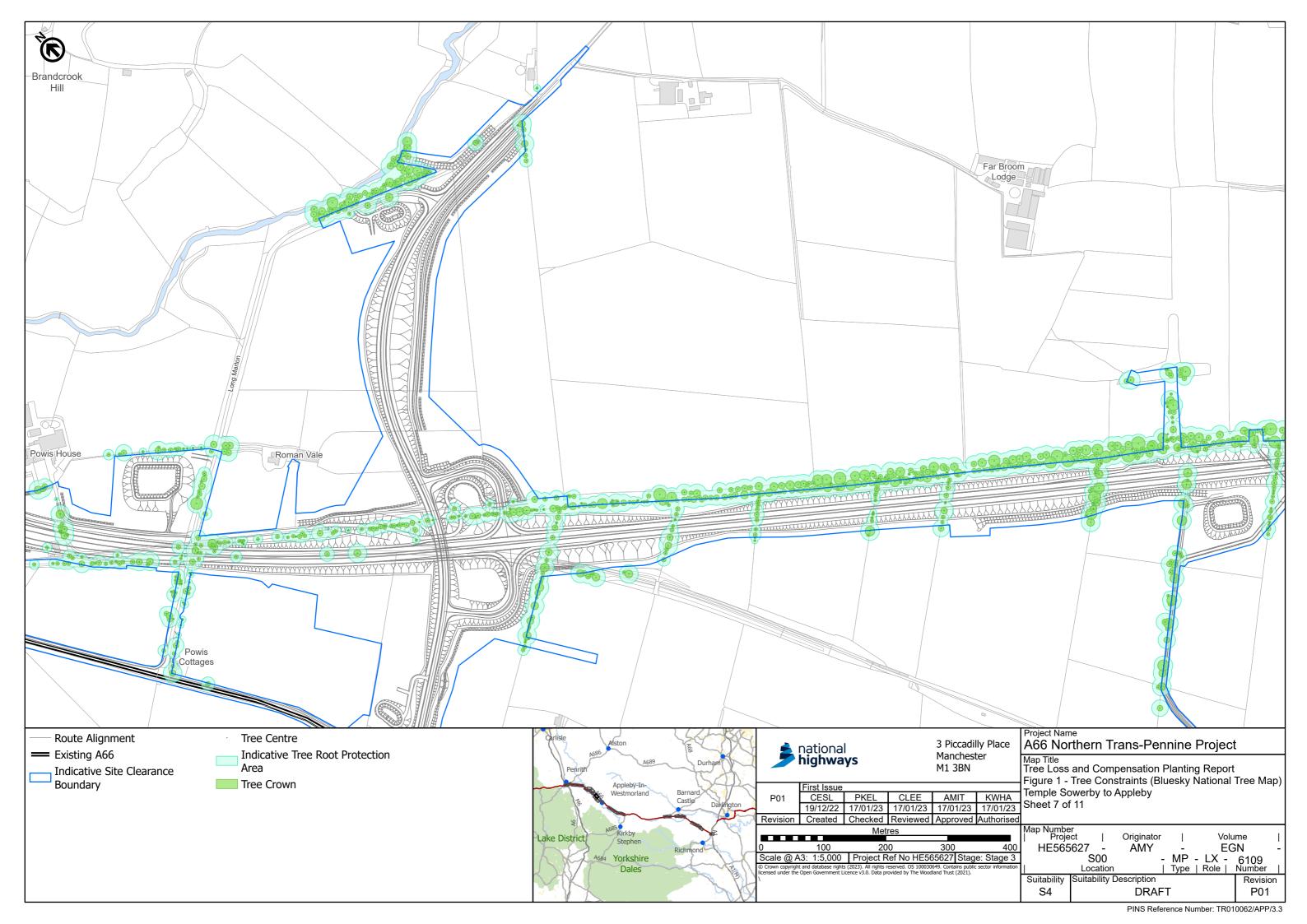


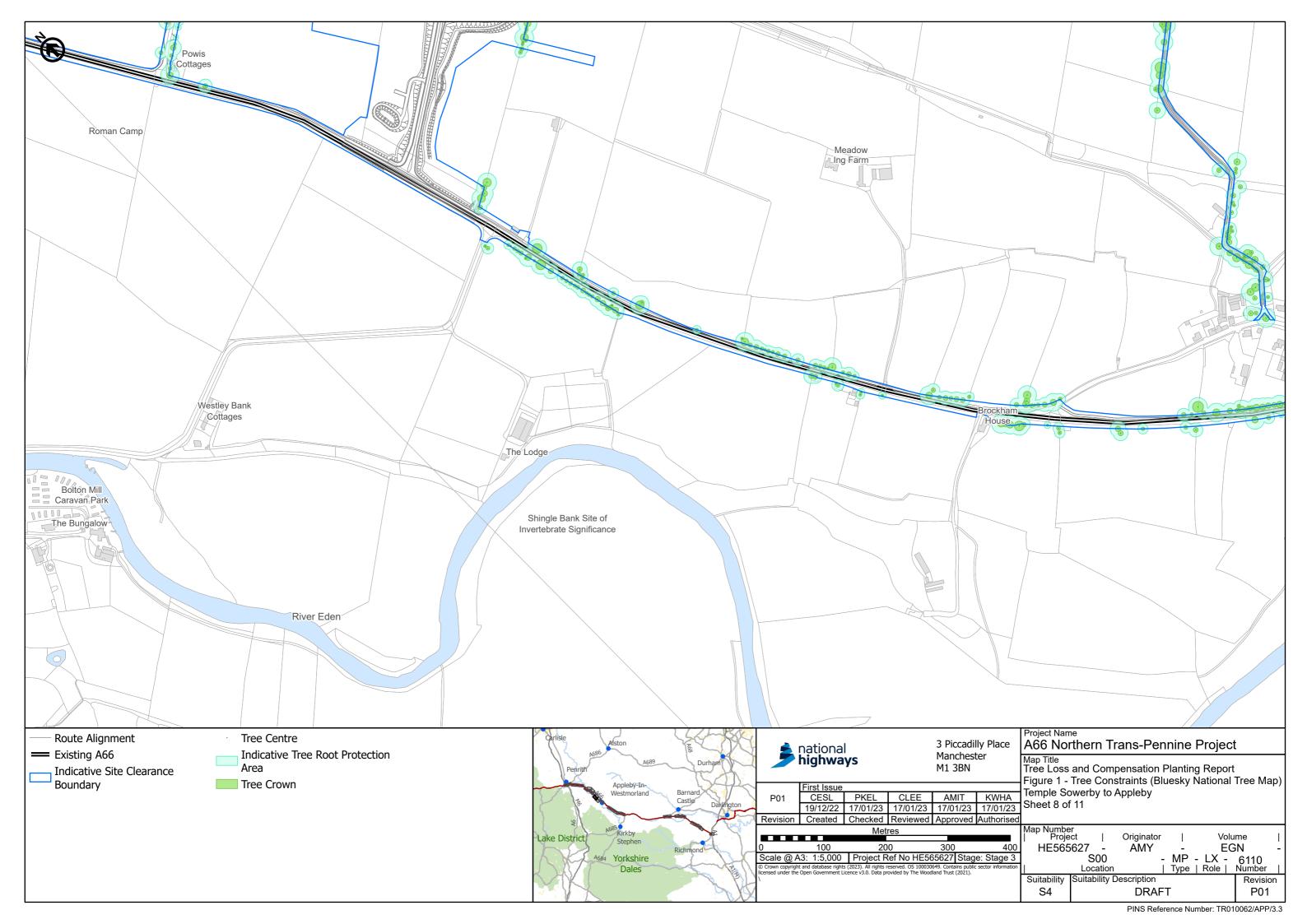


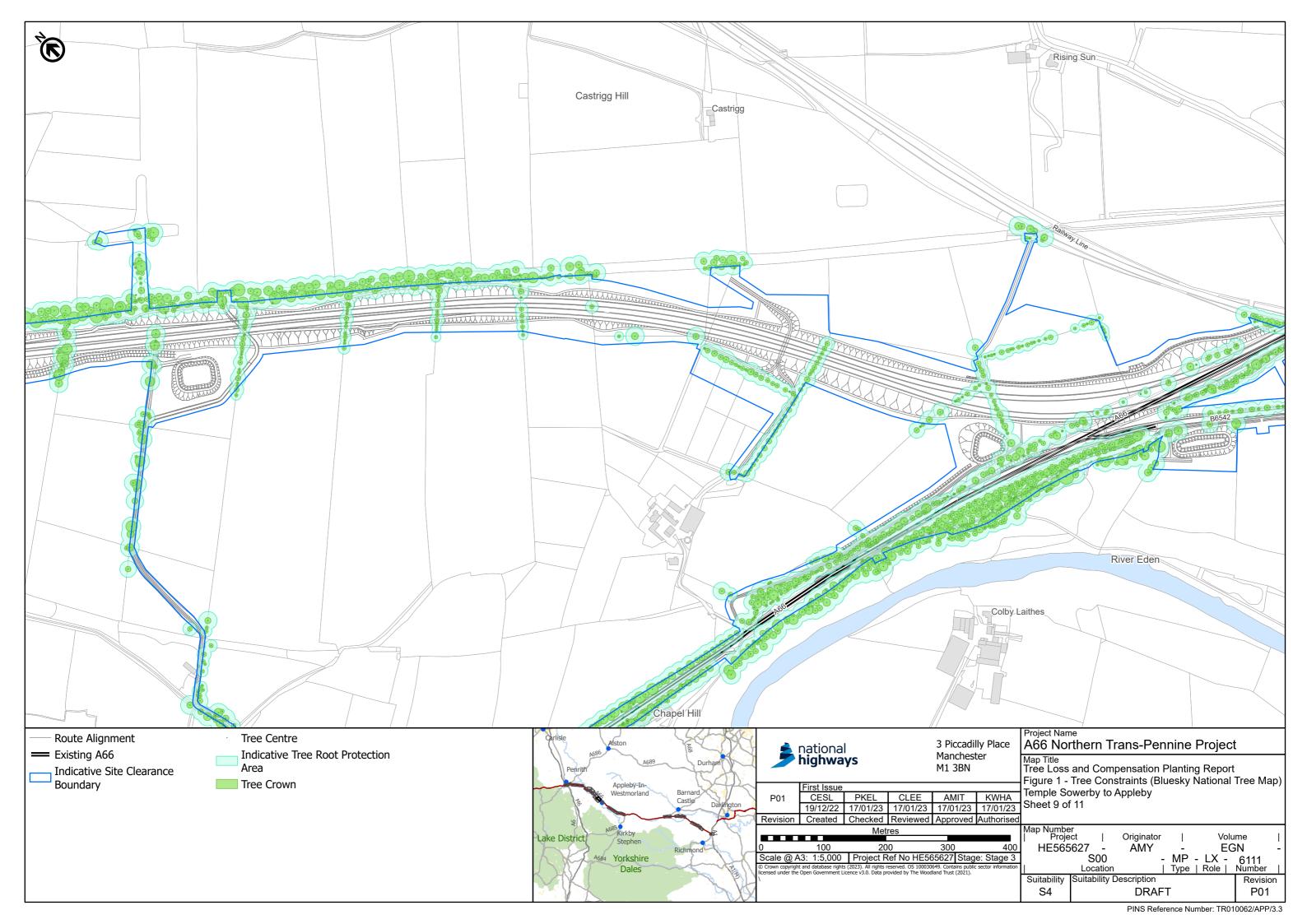


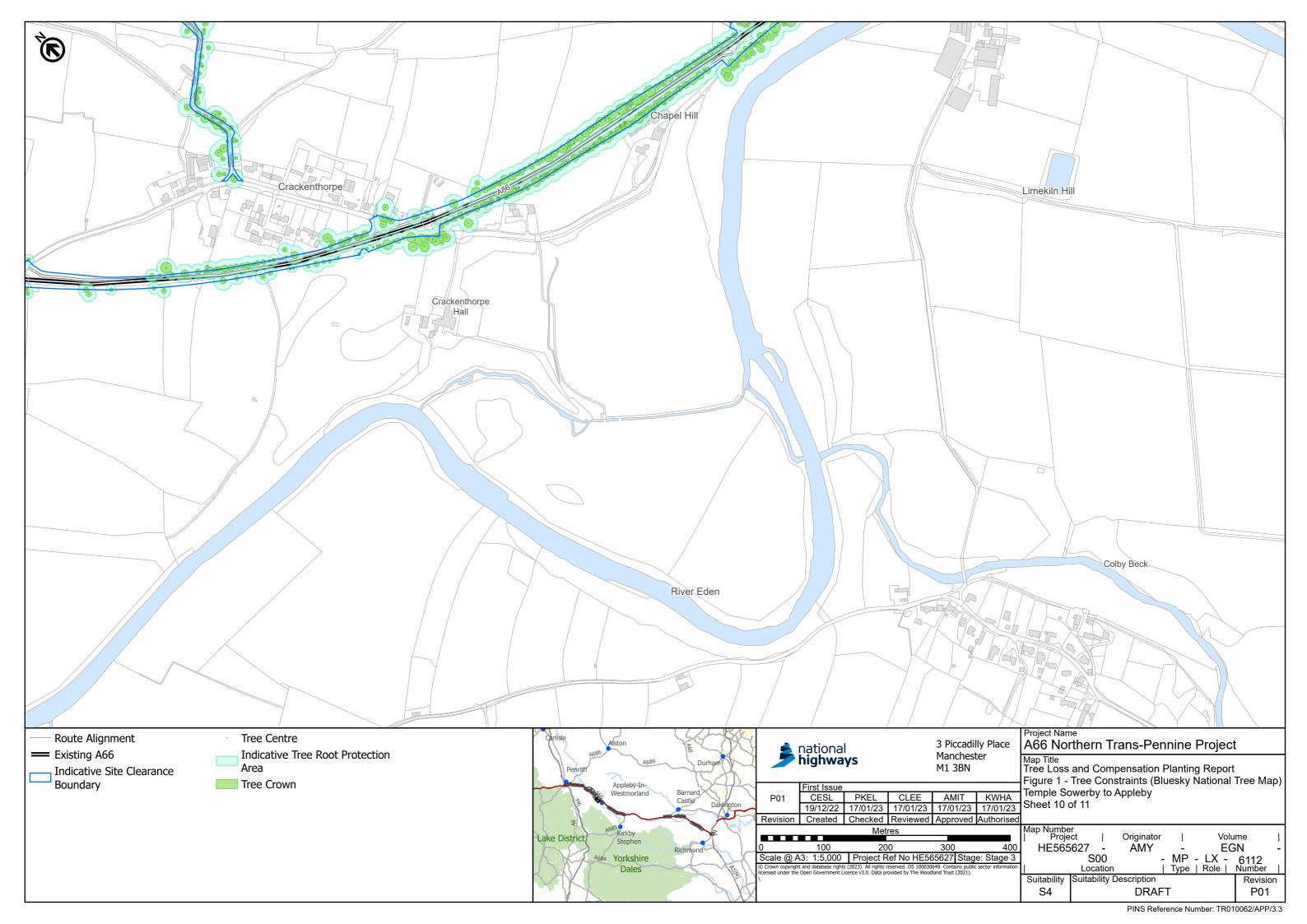


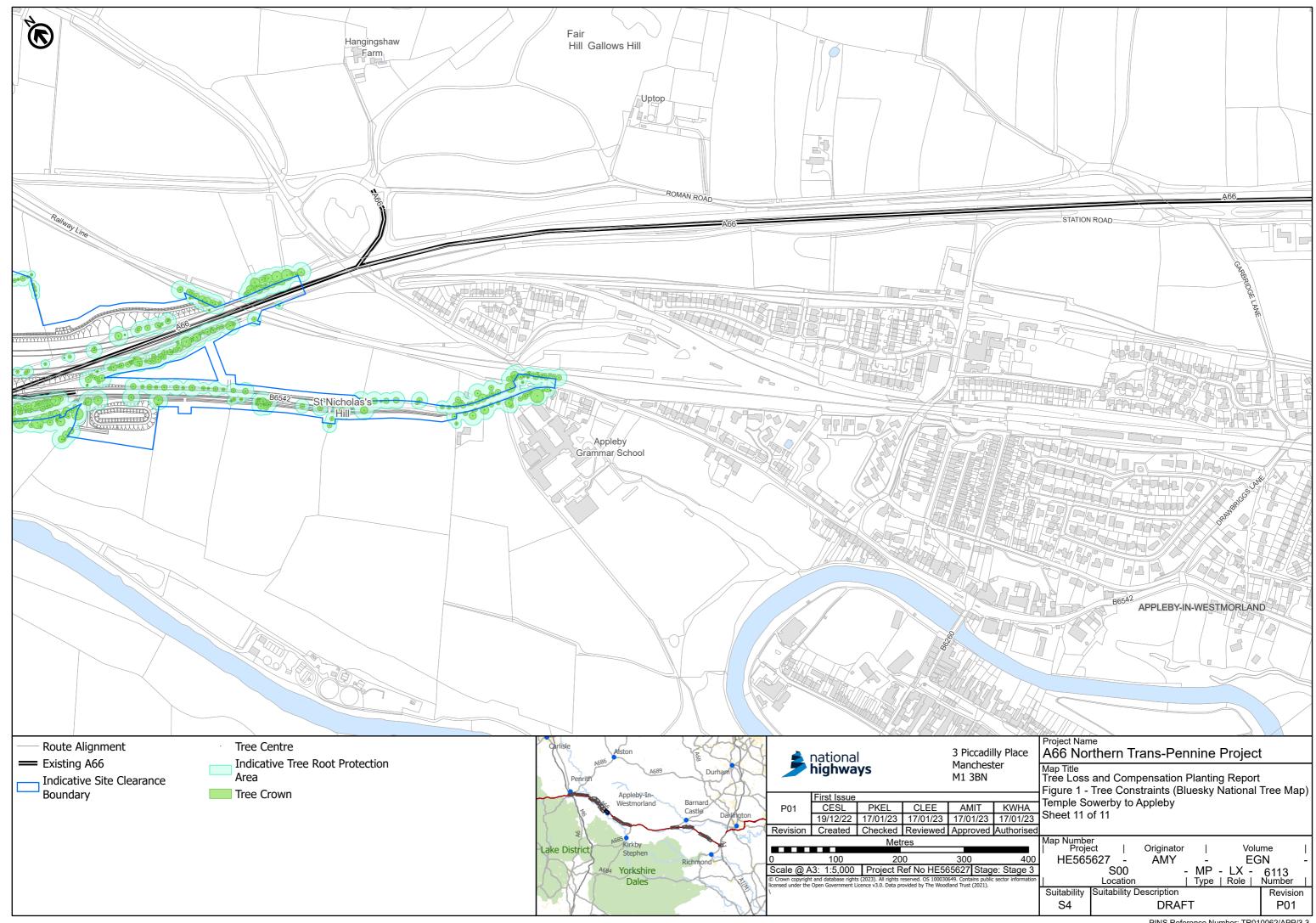


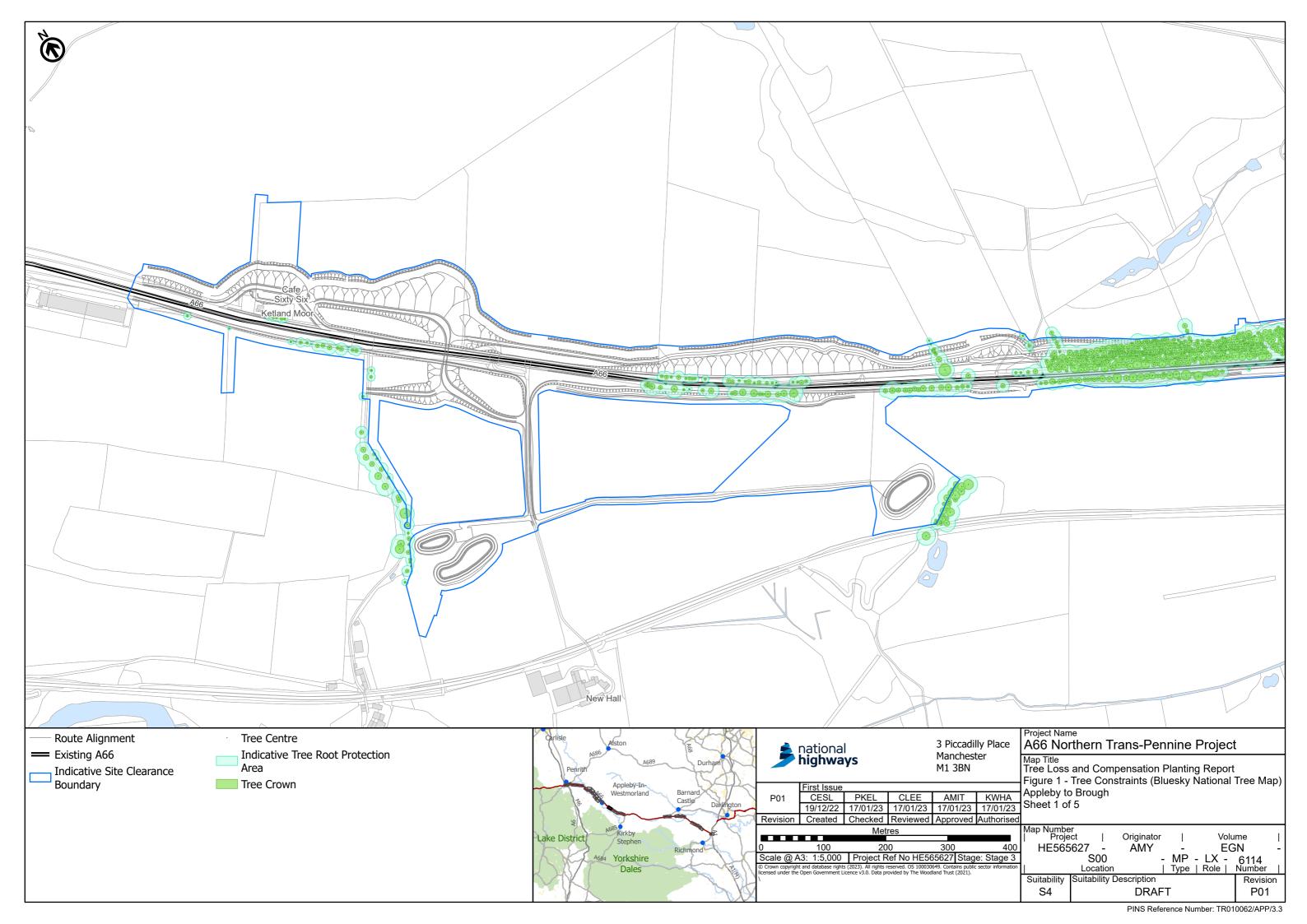


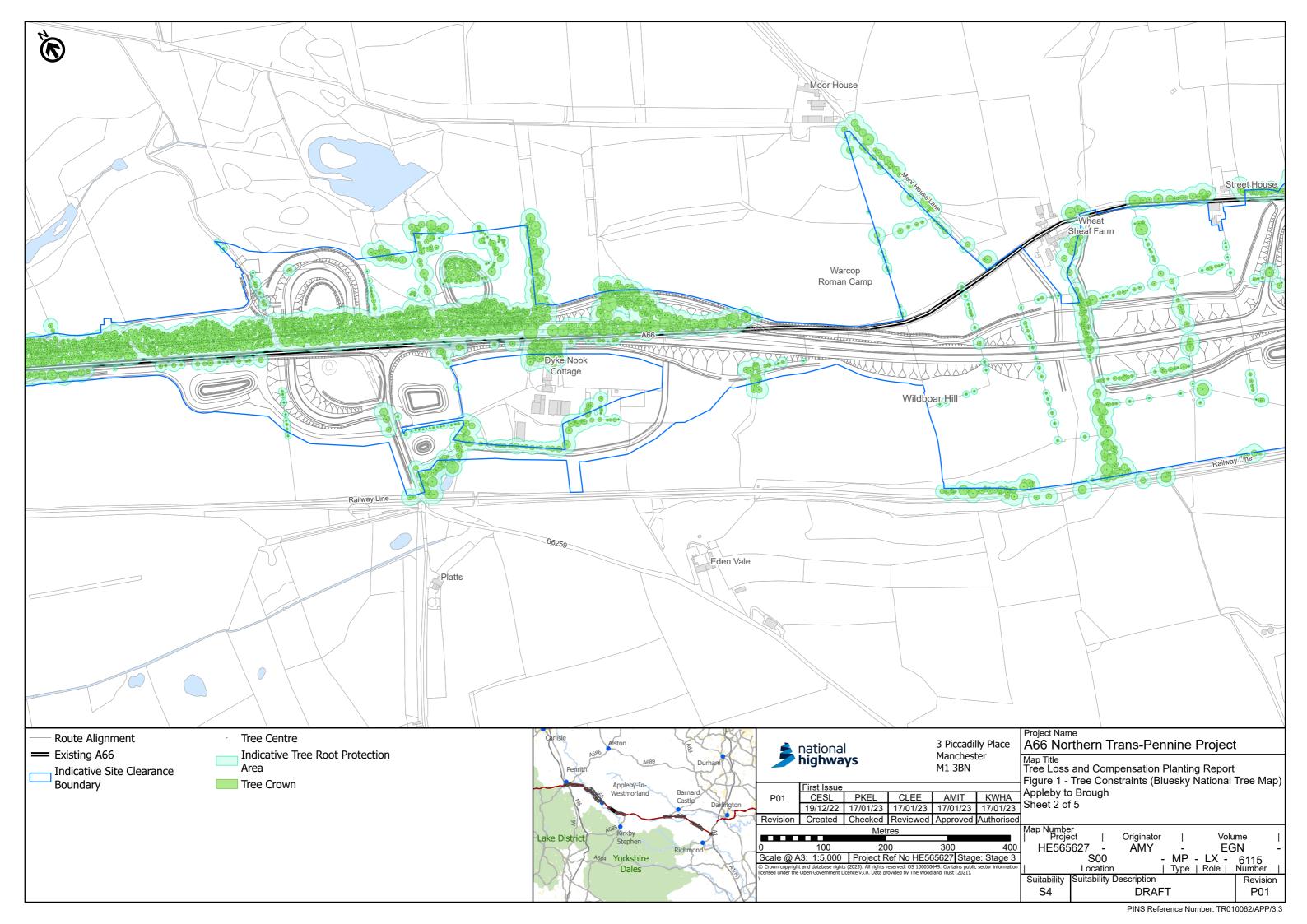


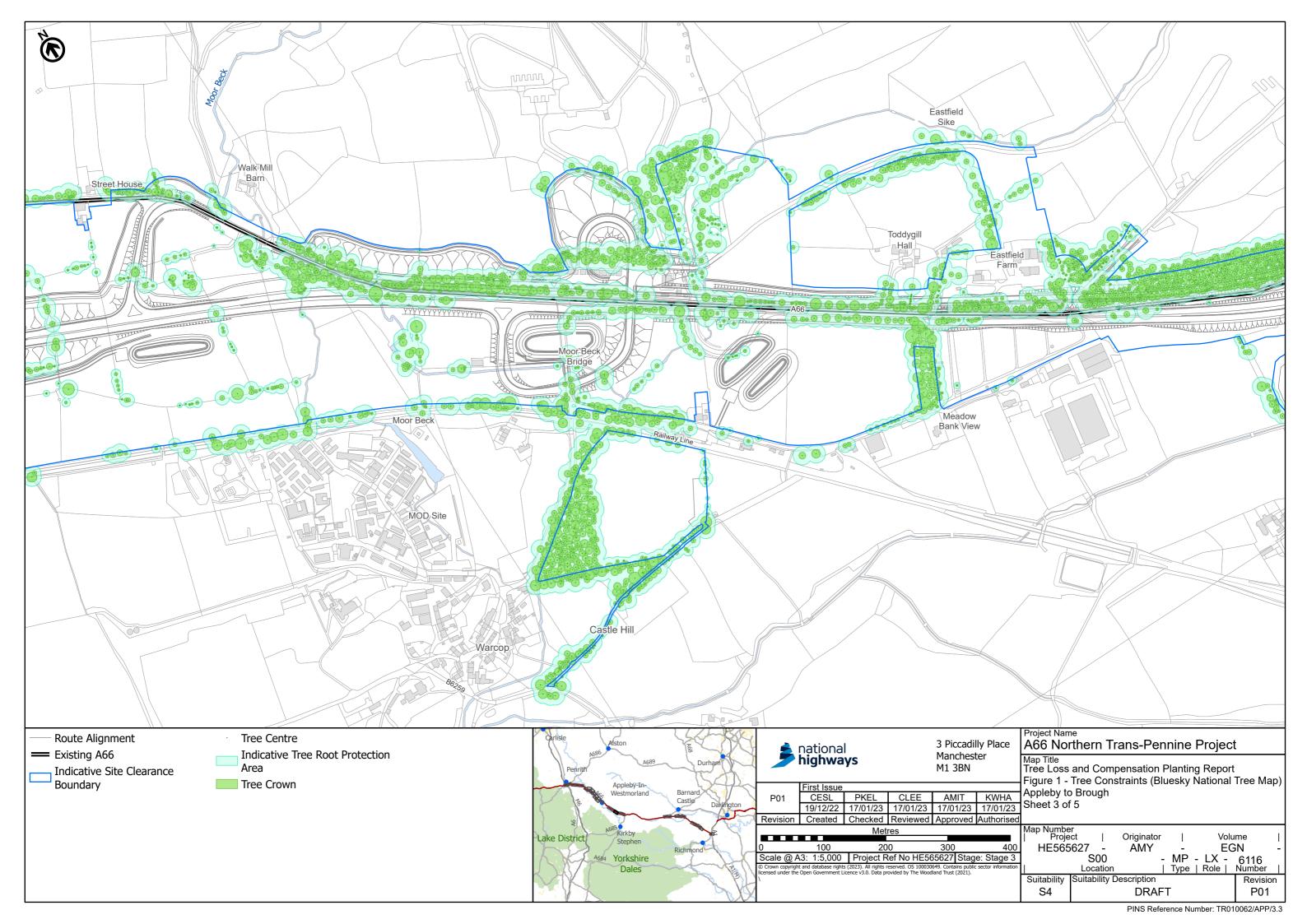


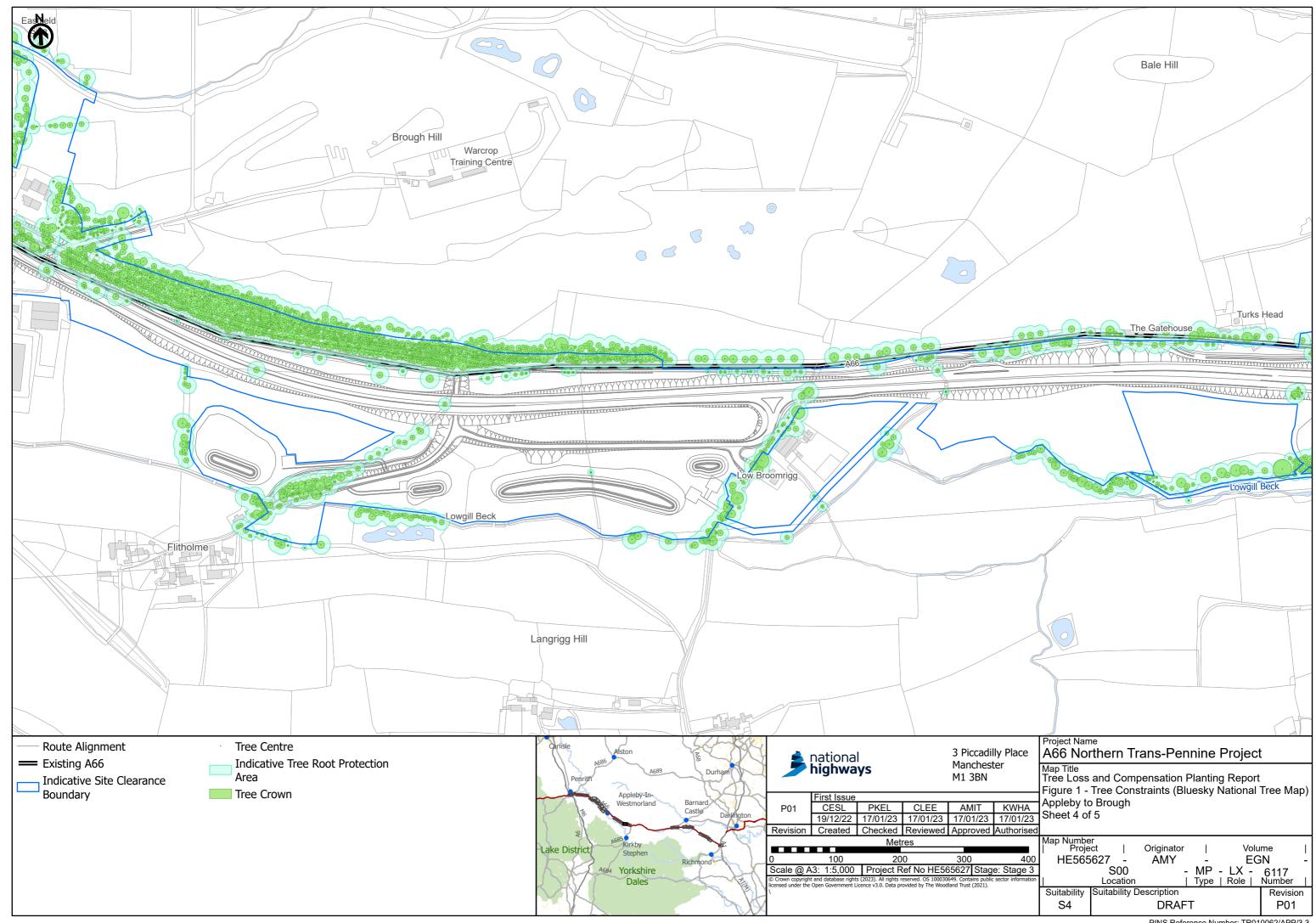


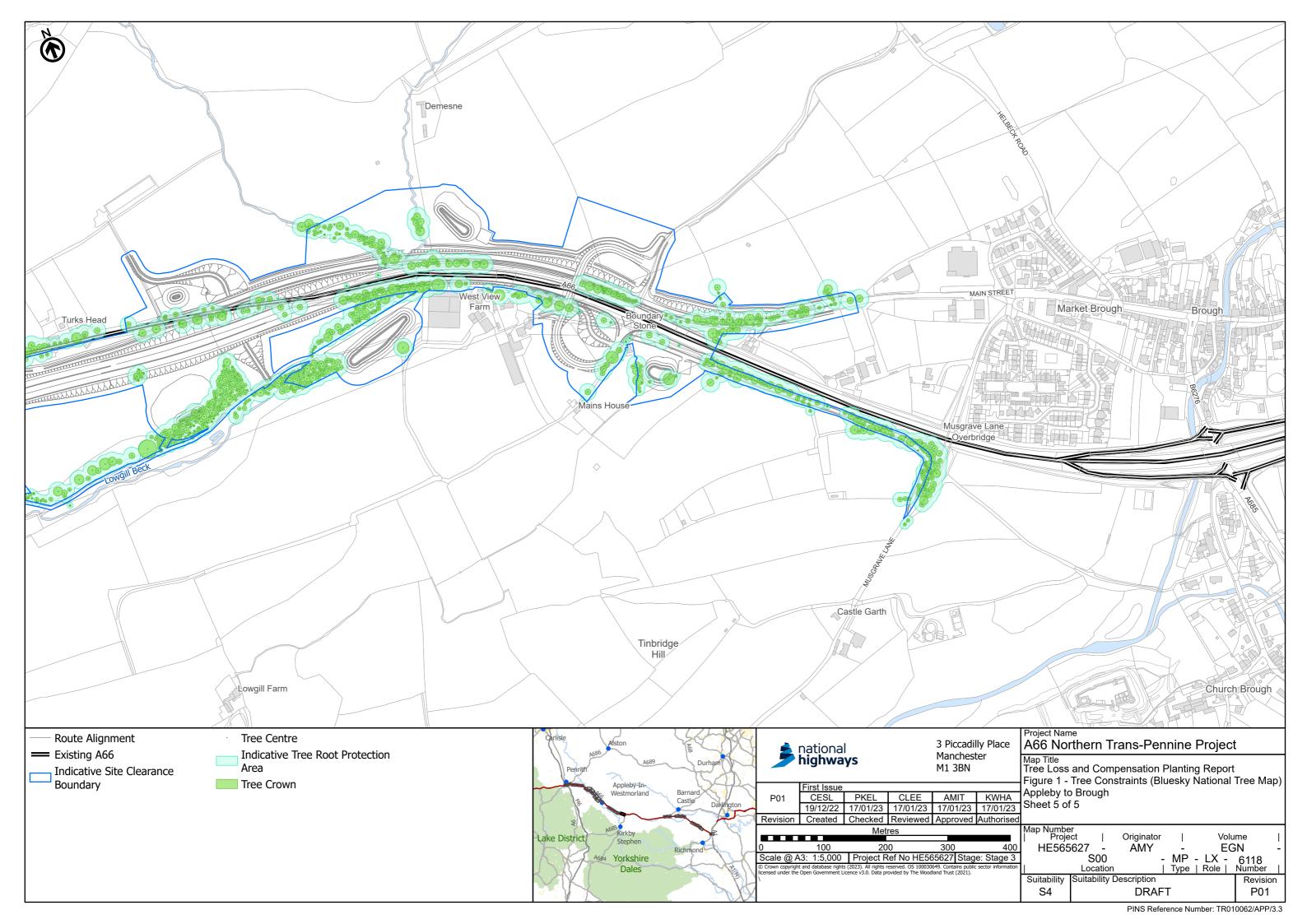


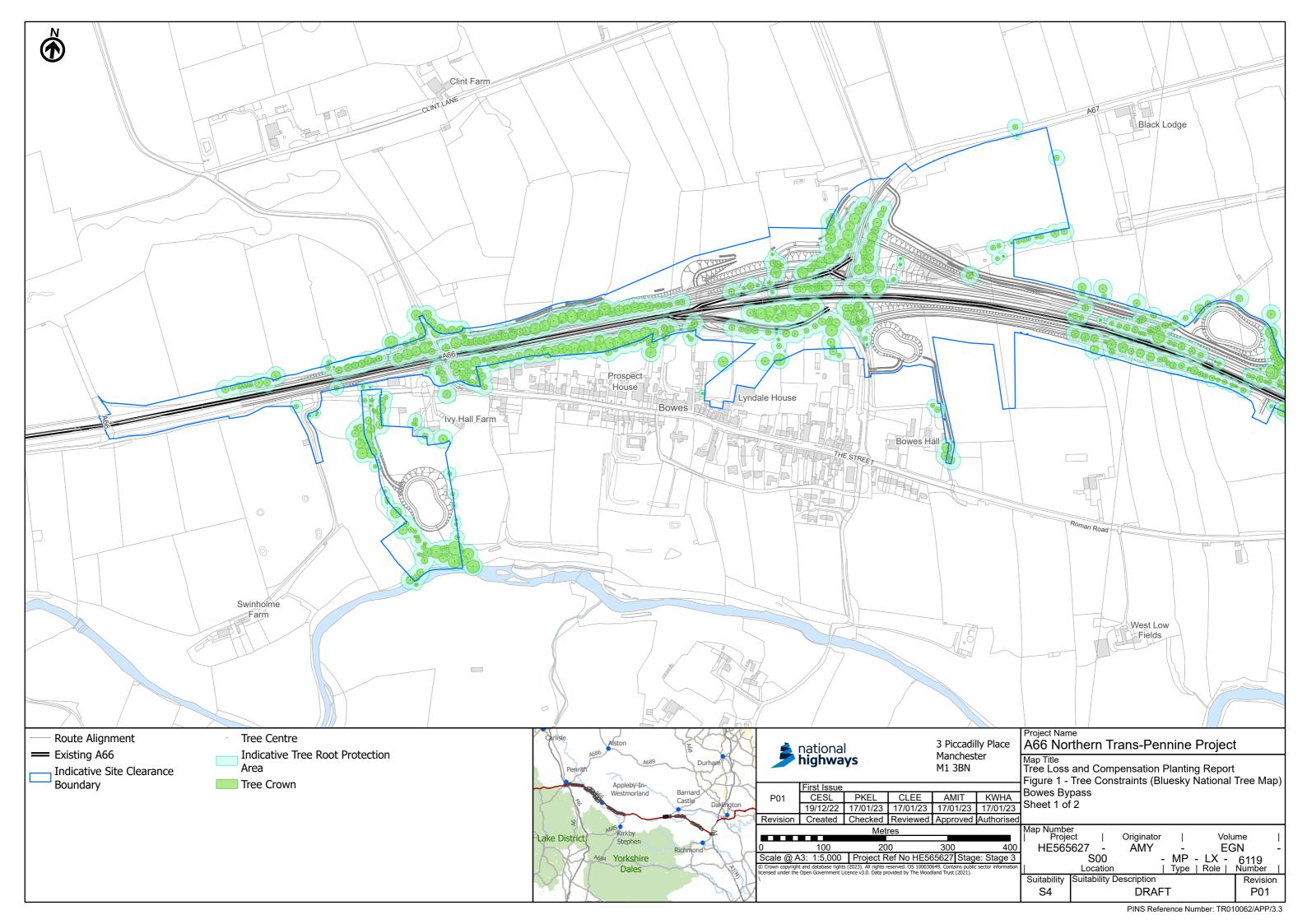


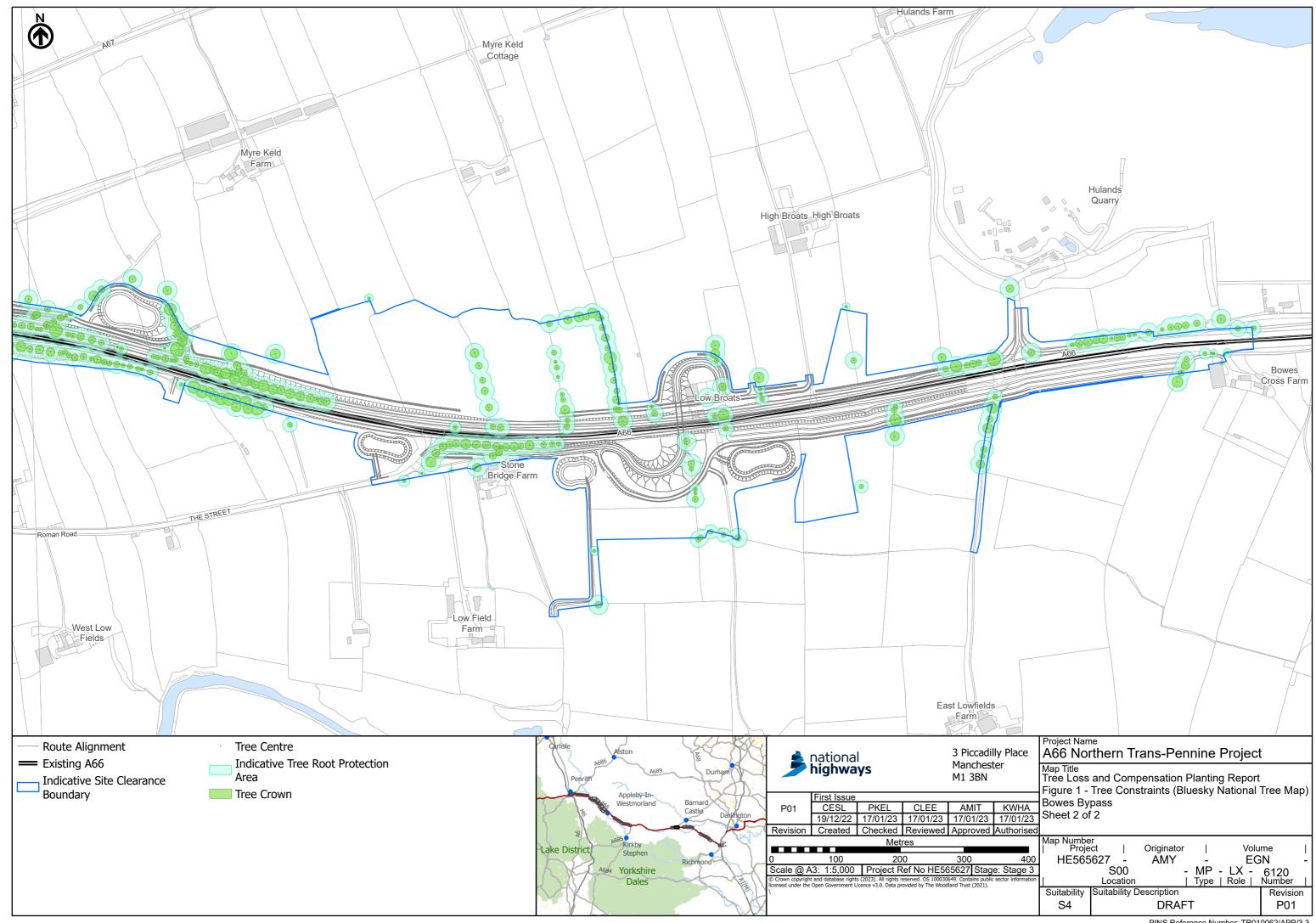


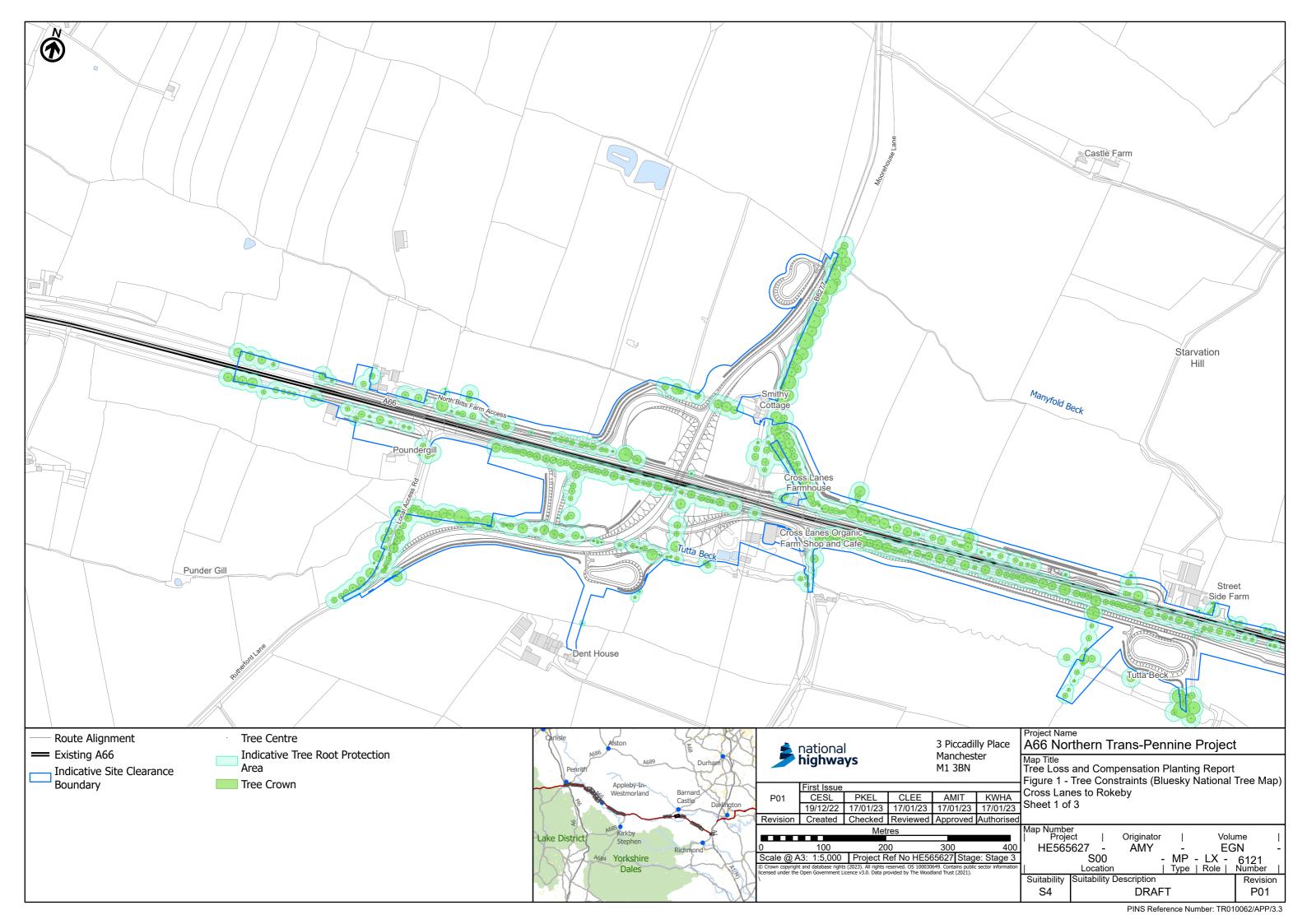


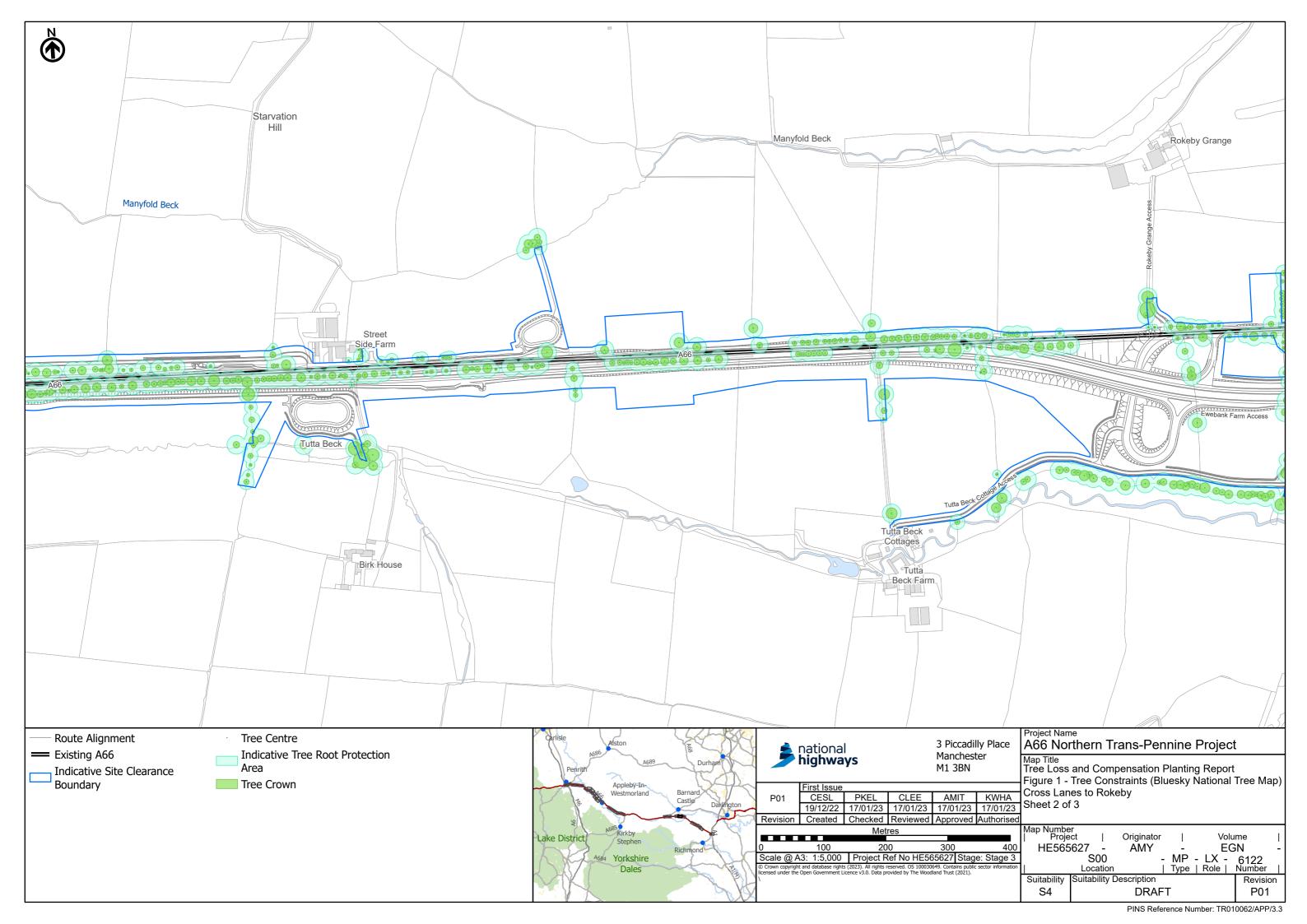


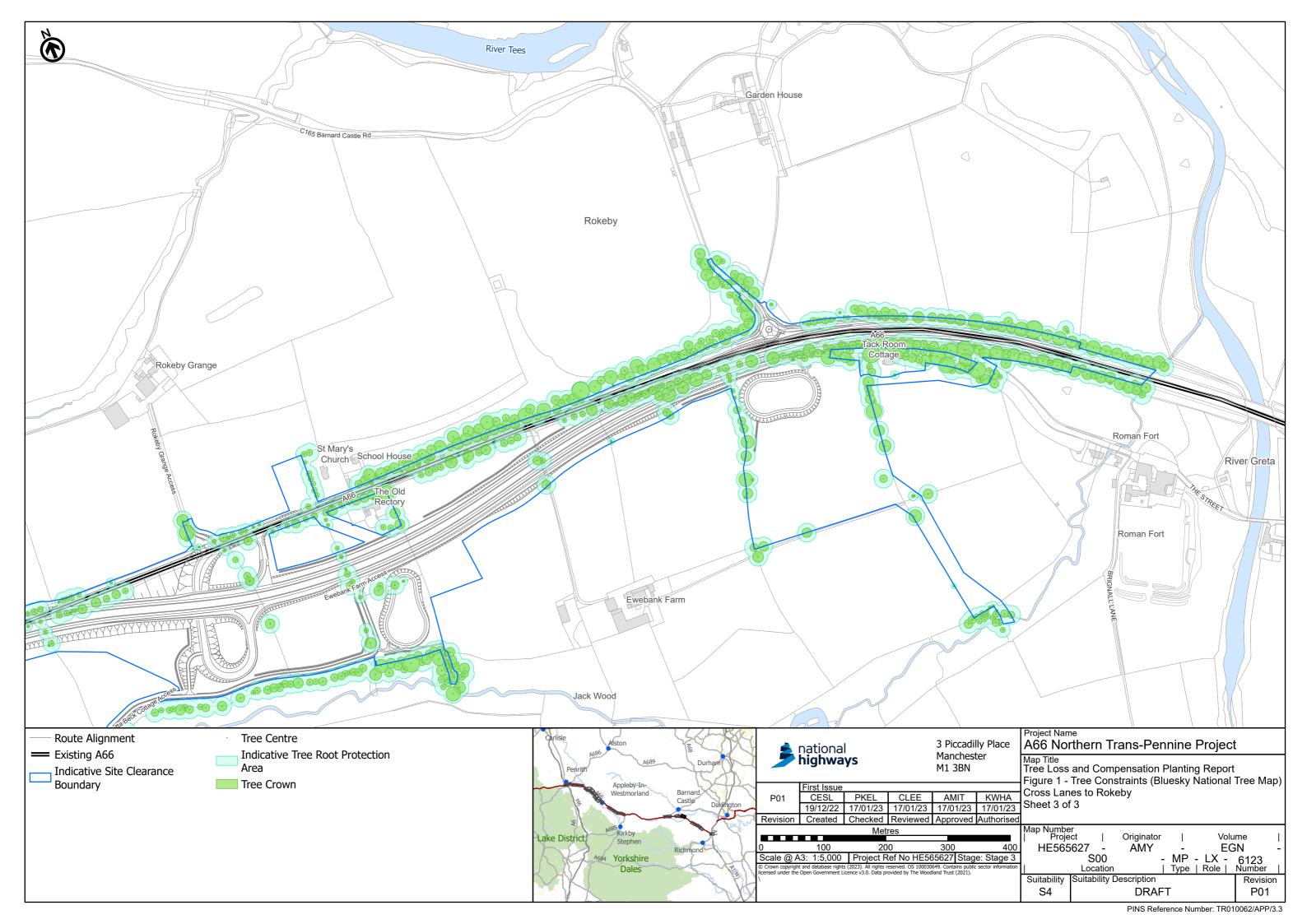


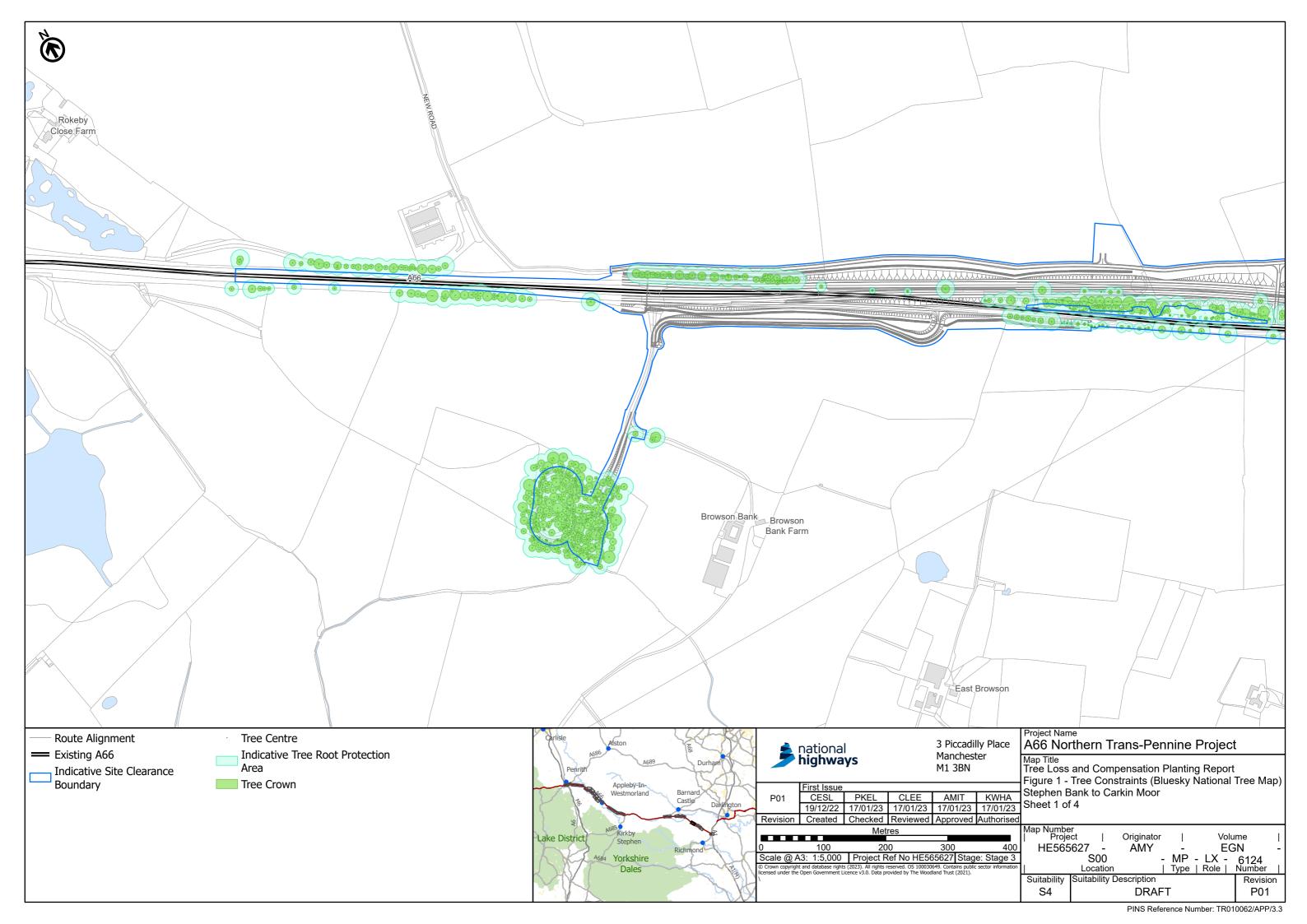


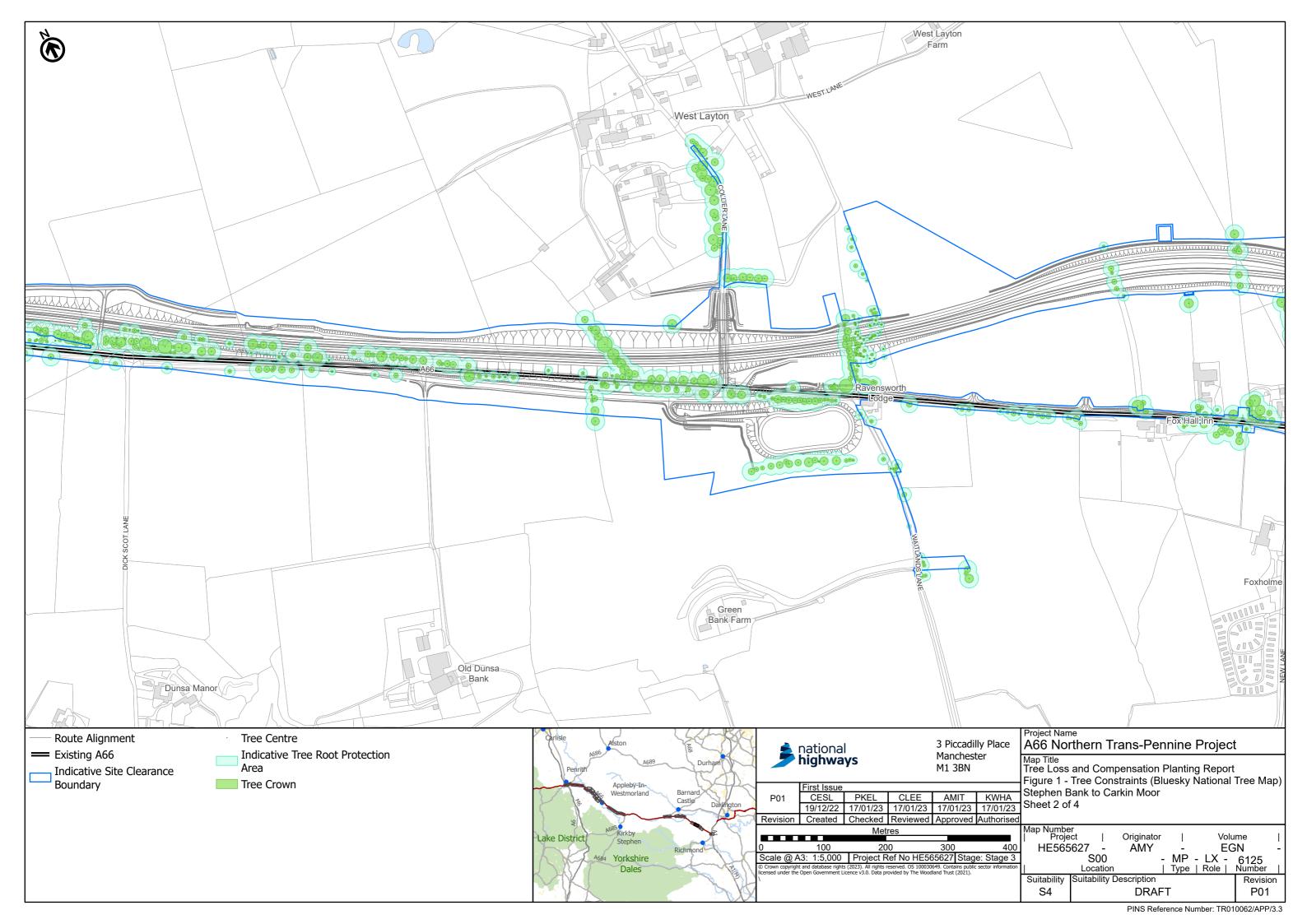


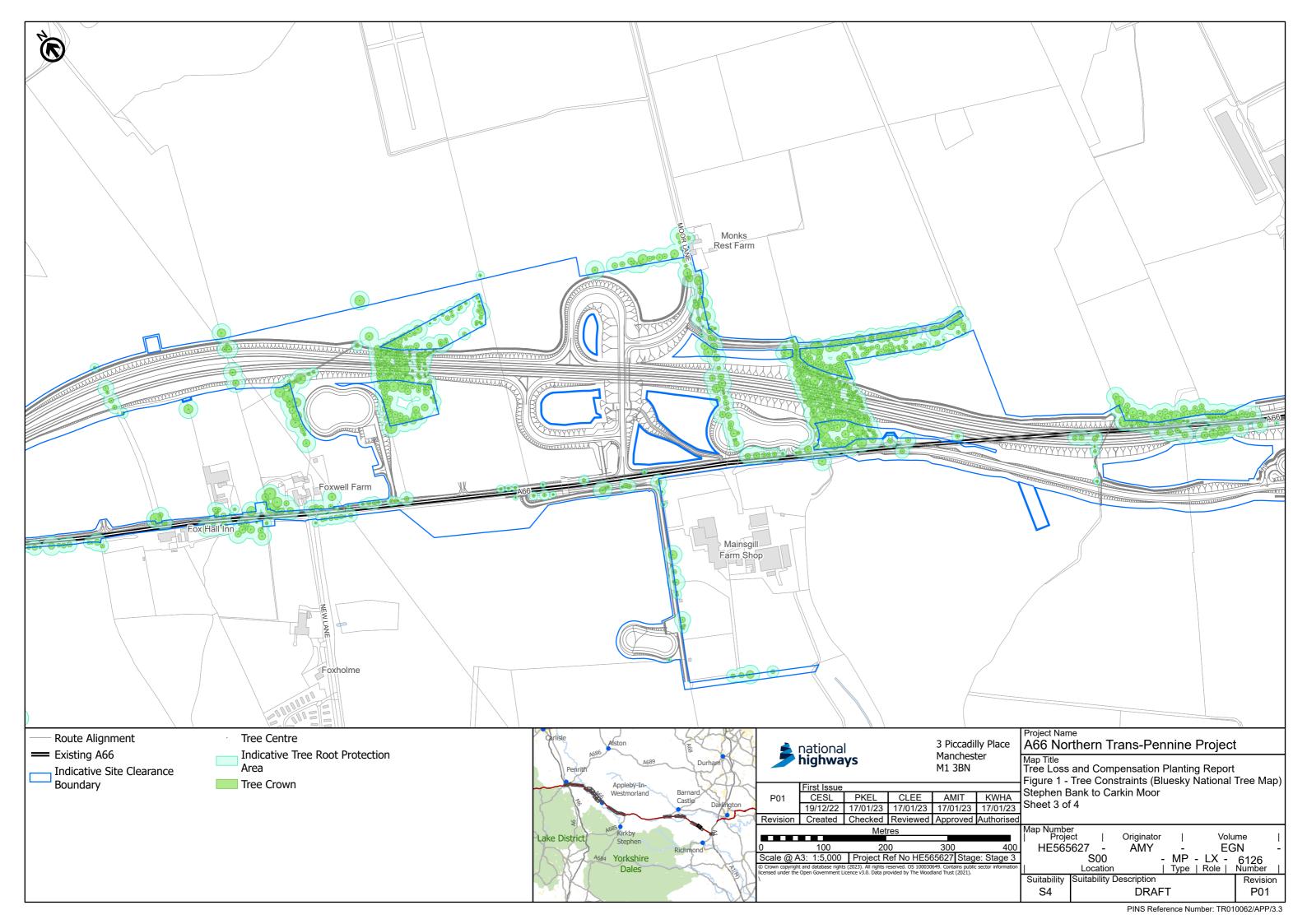


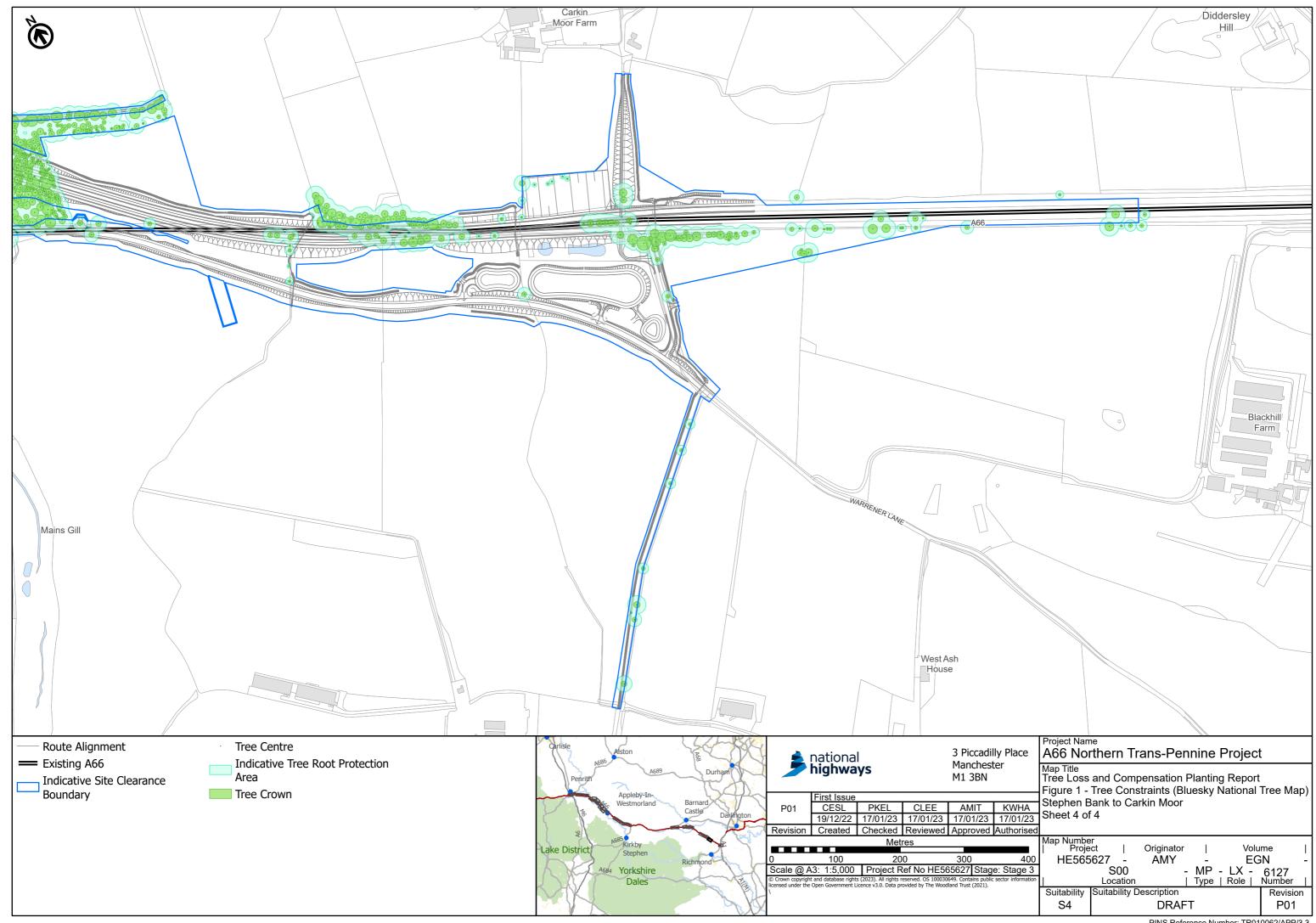


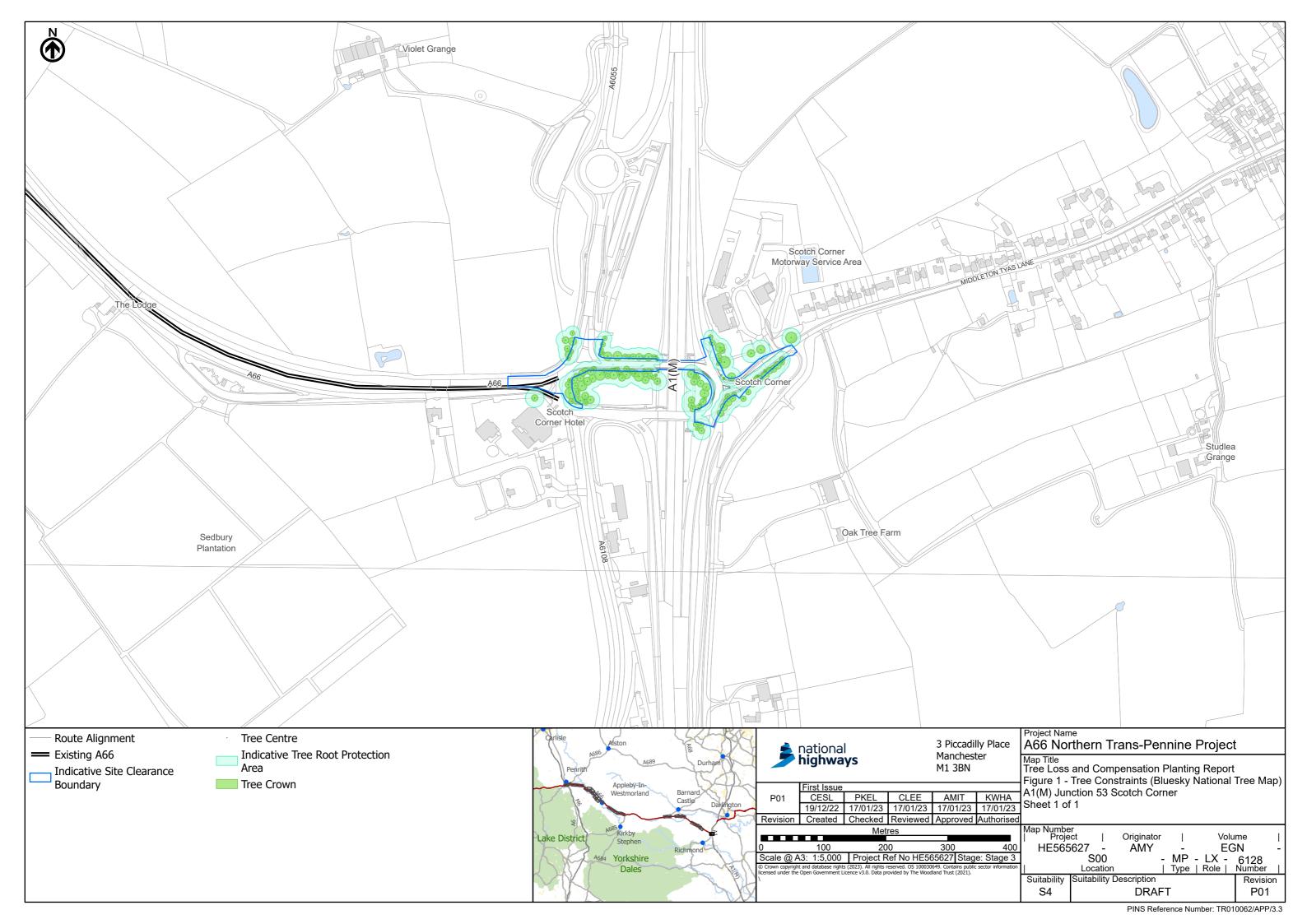






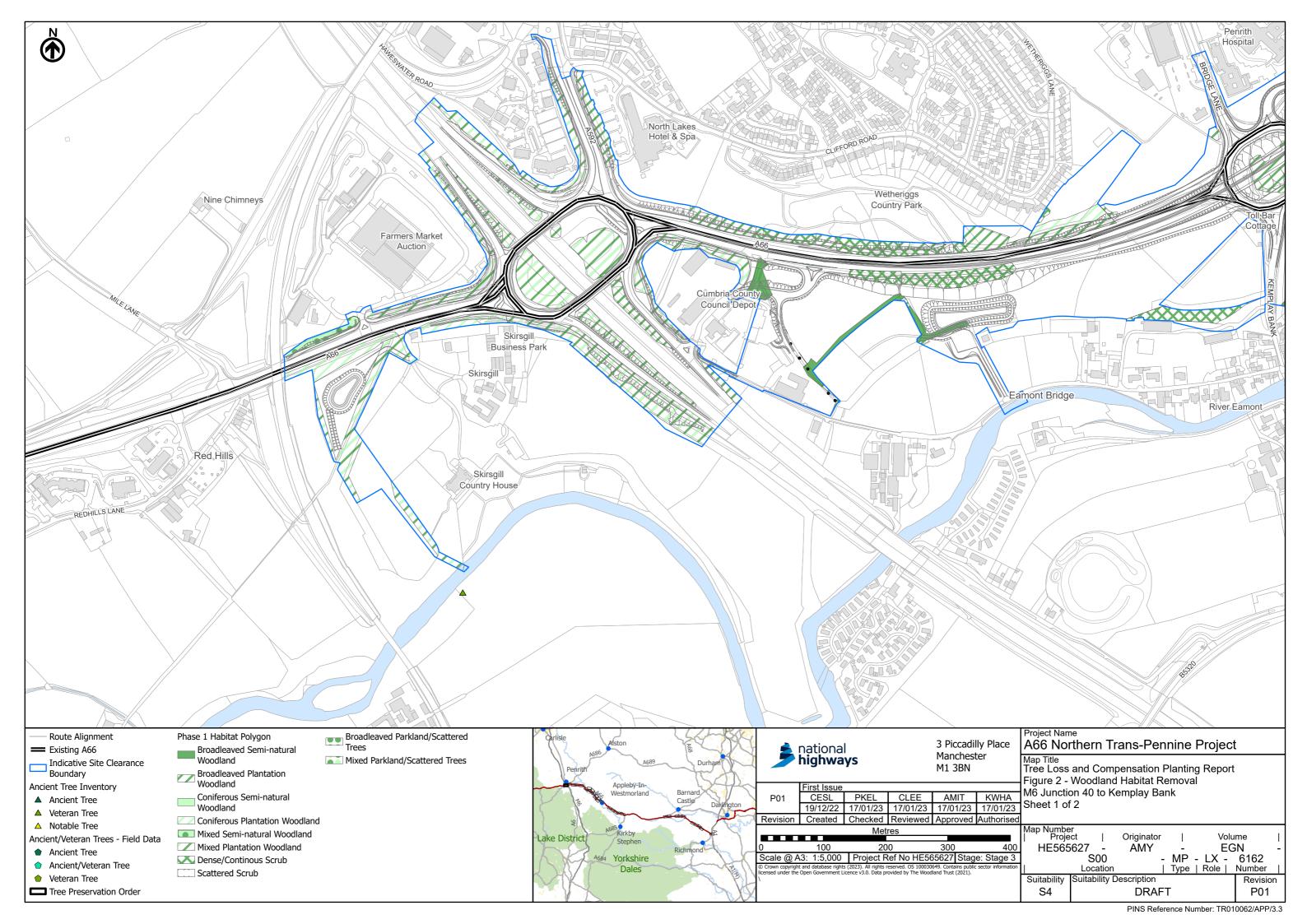


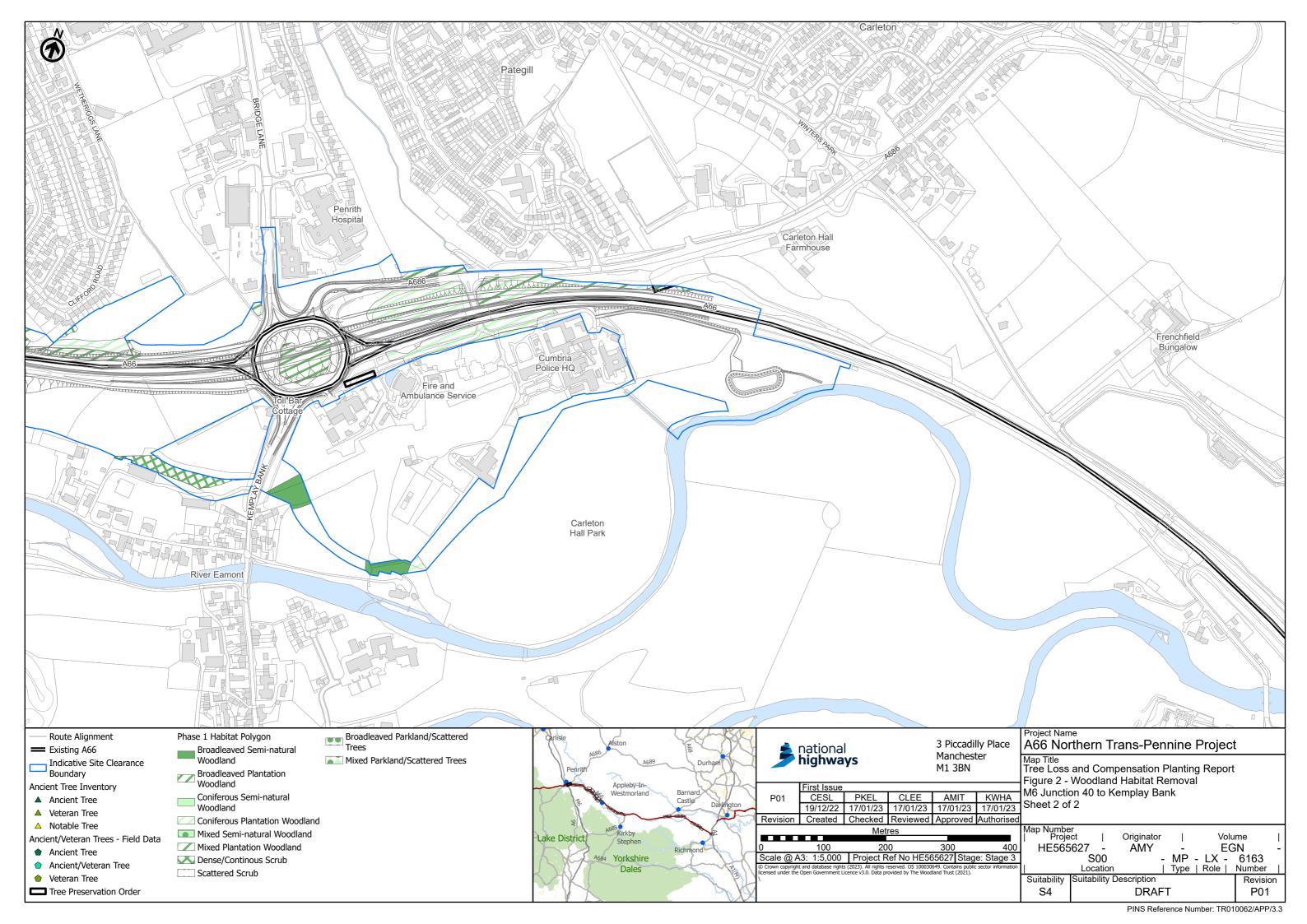


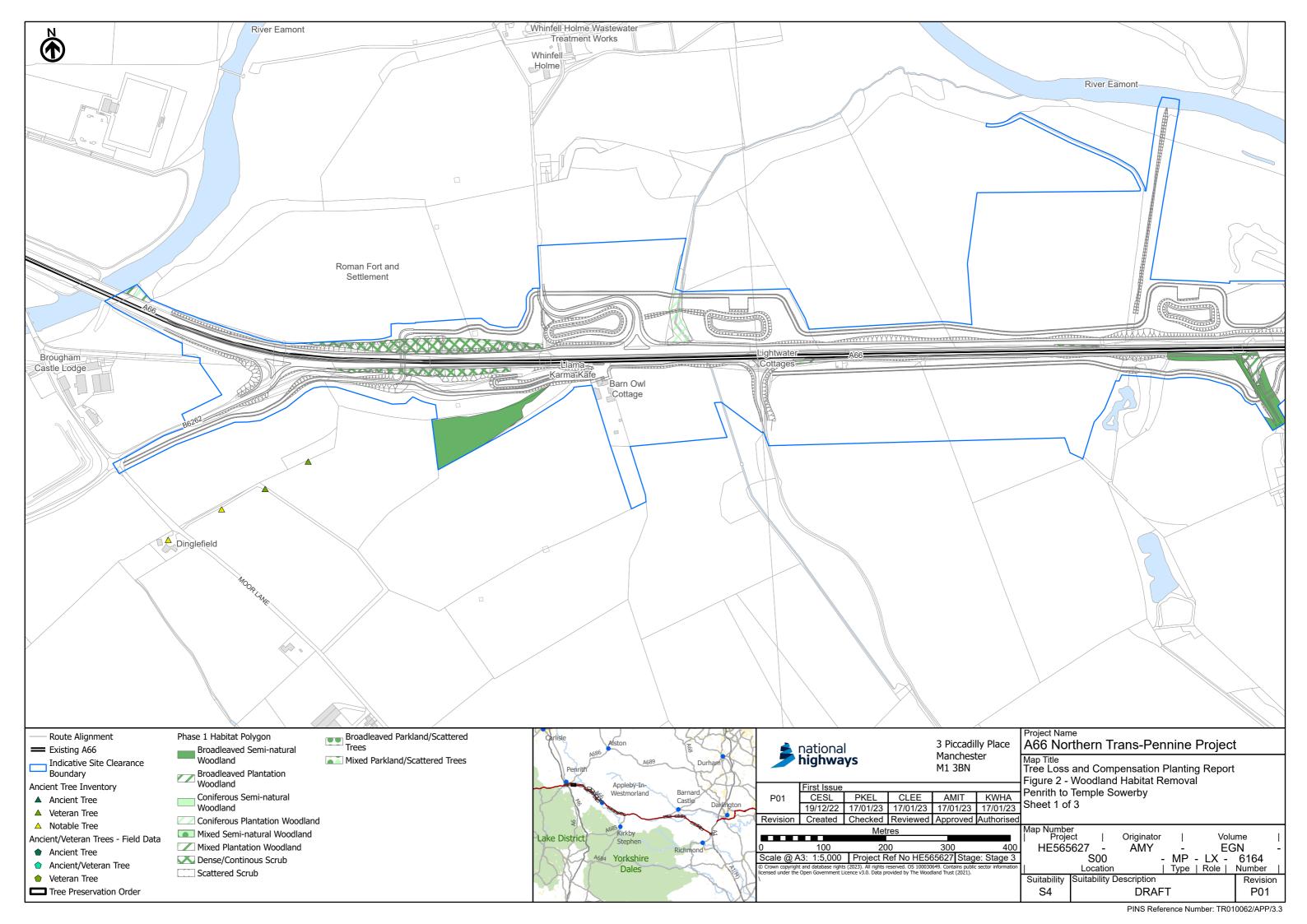


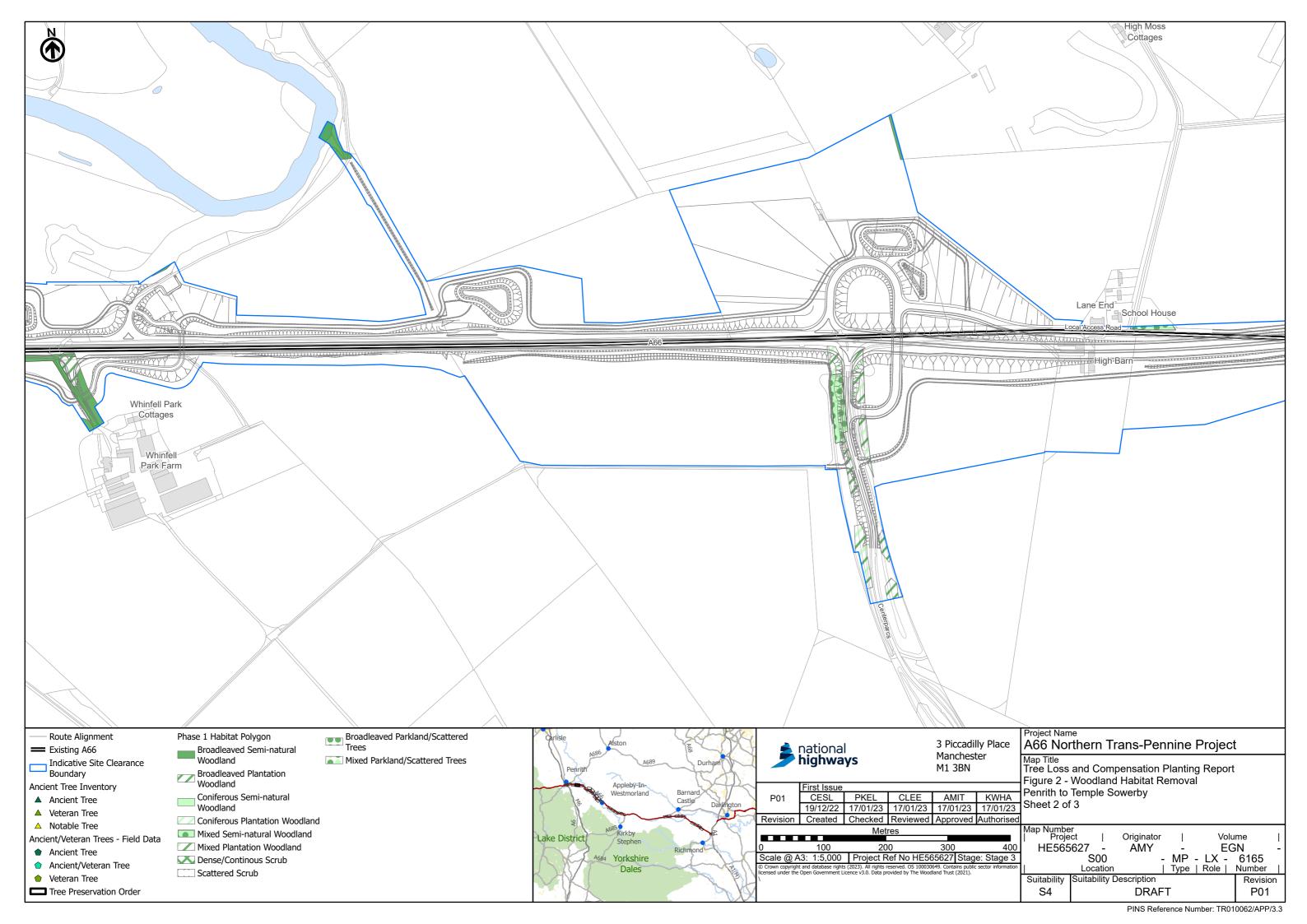


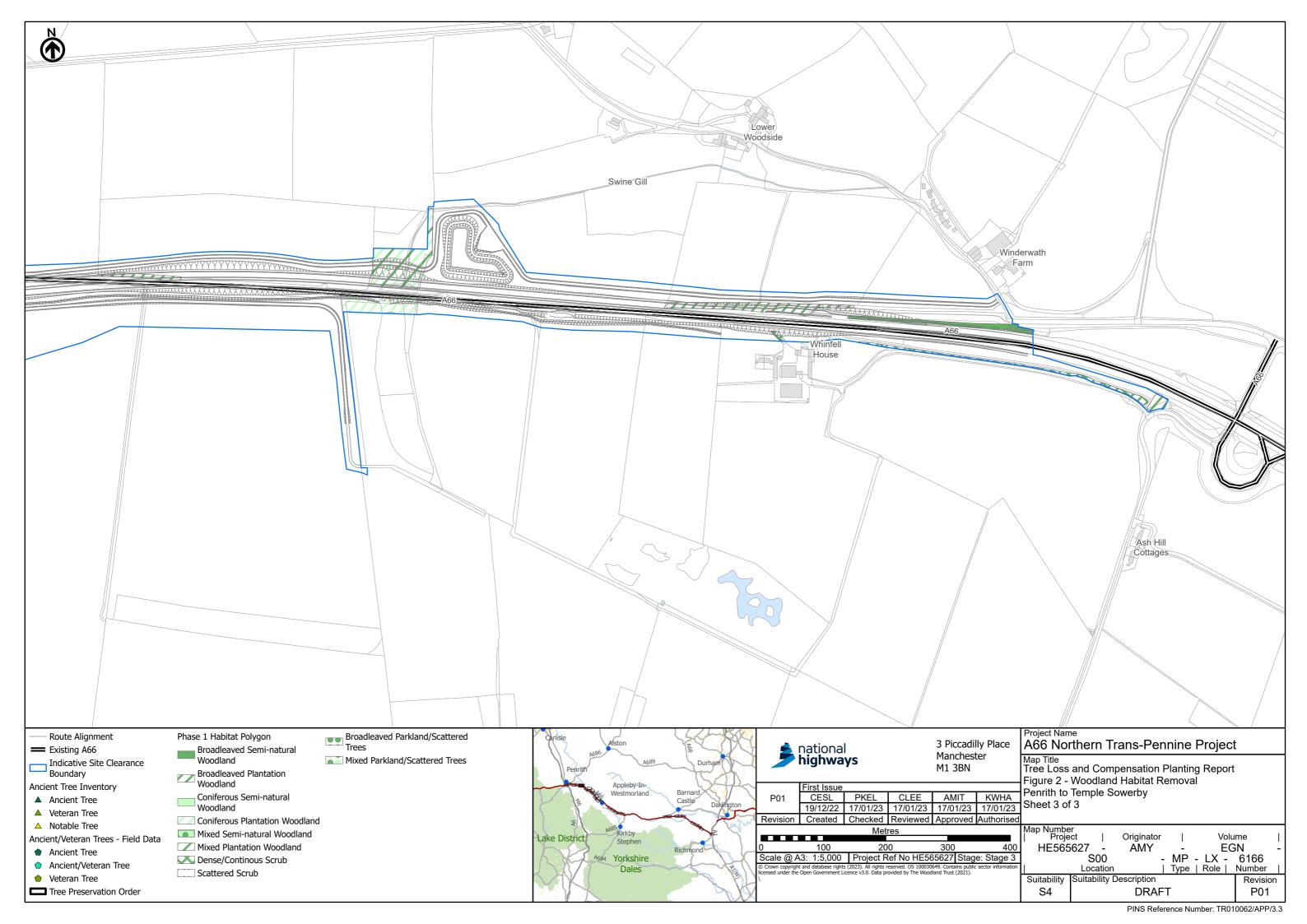
Appendix 2: Figure 2 – Woodland Habitat Removal

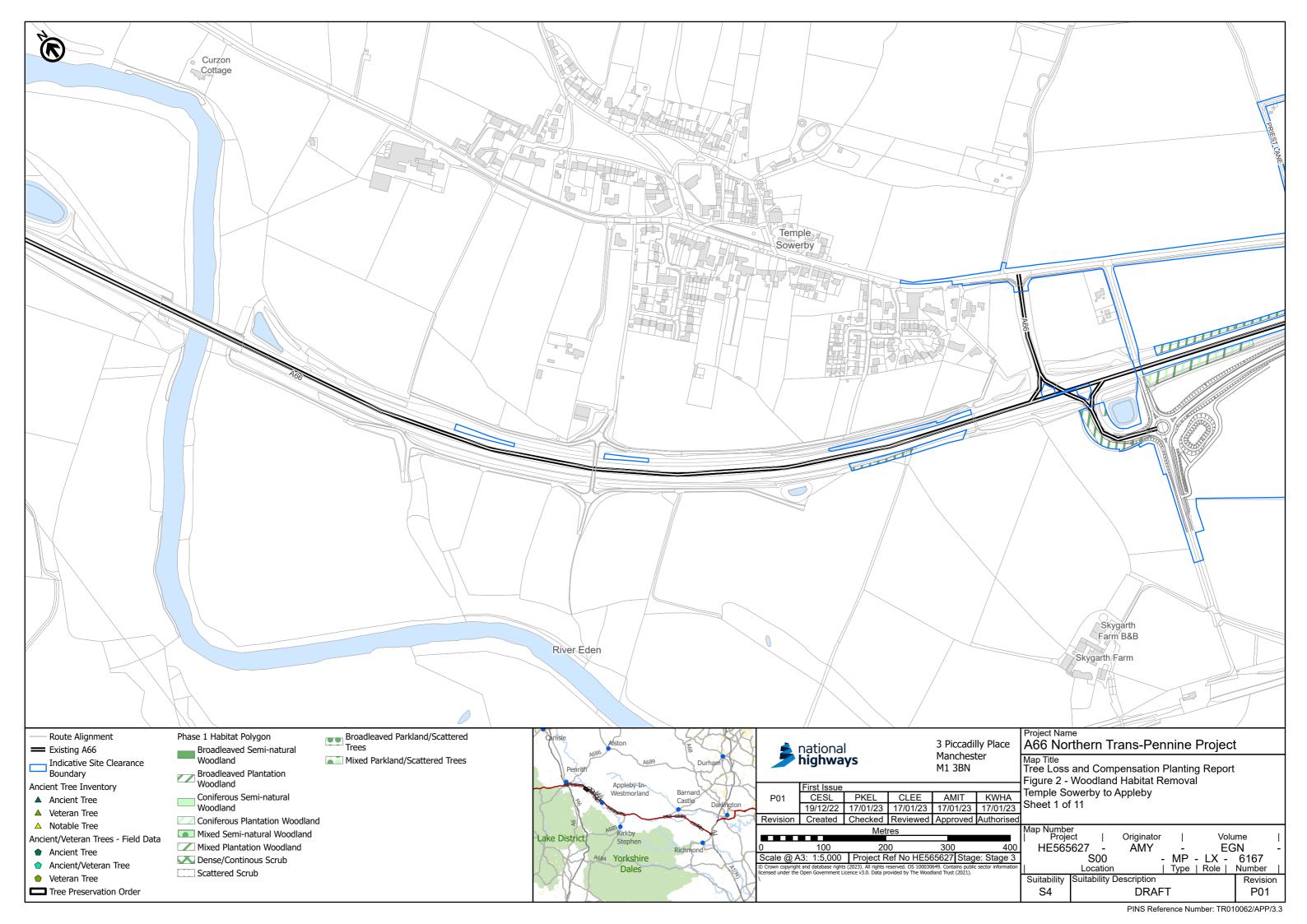


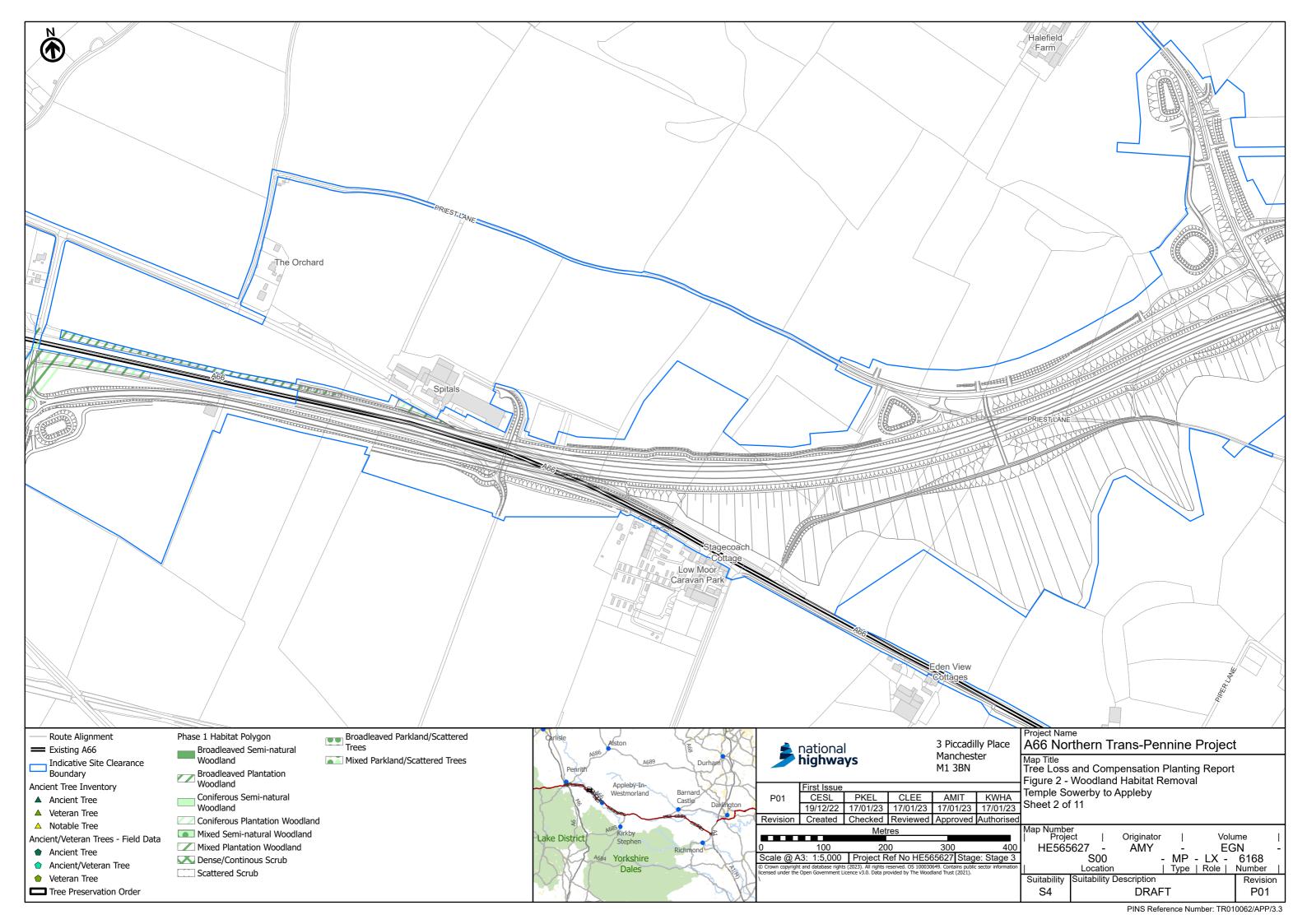


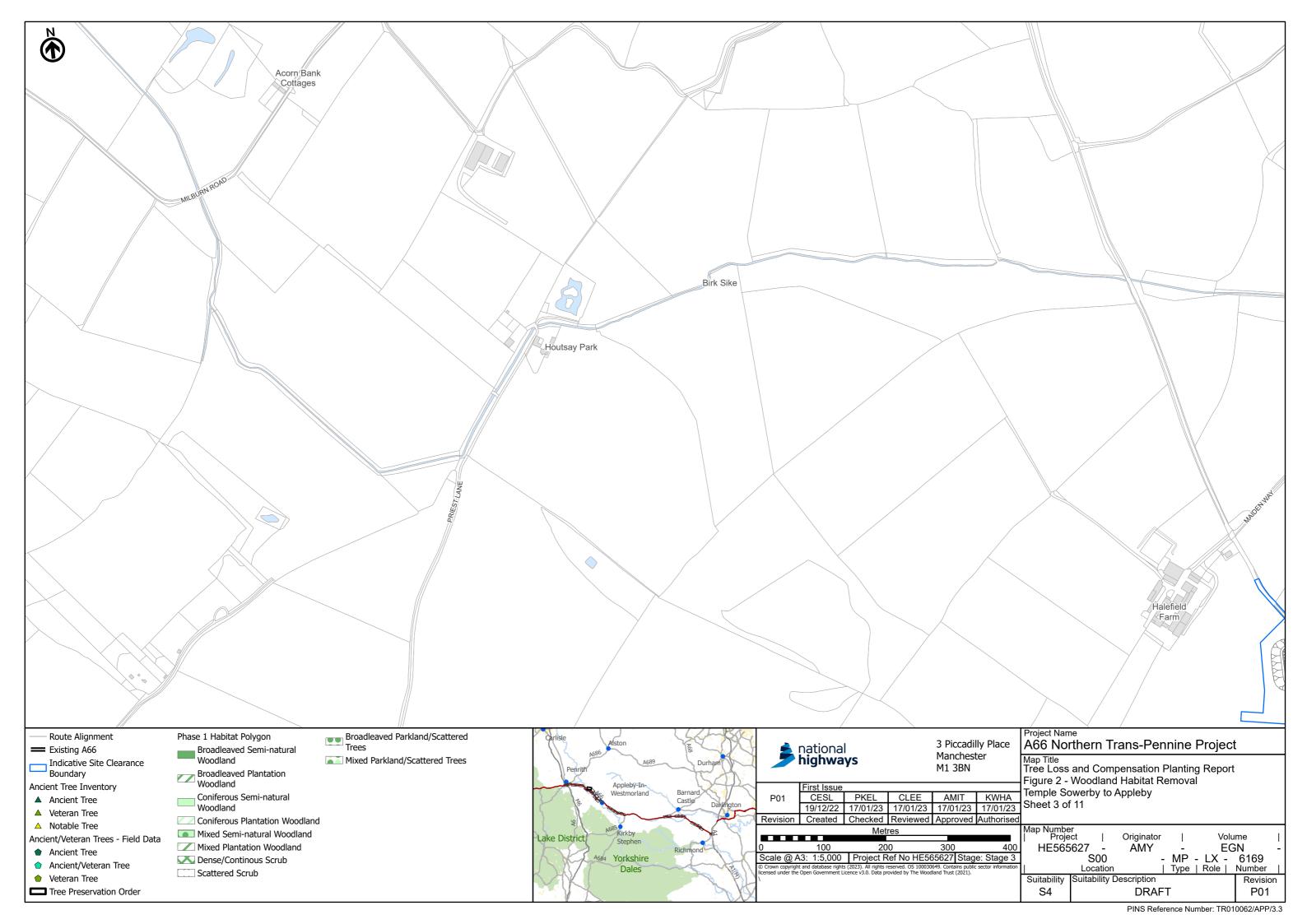


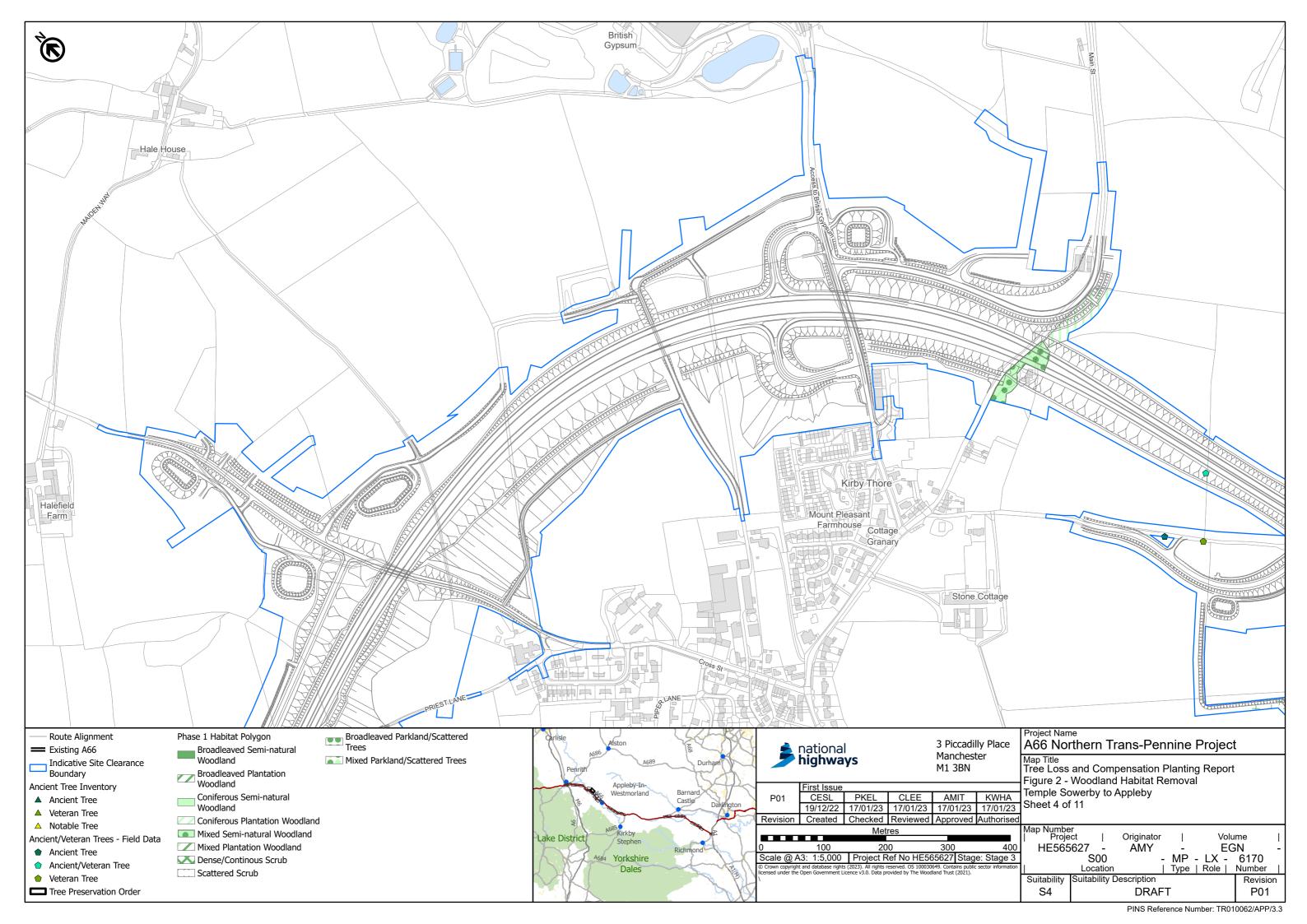


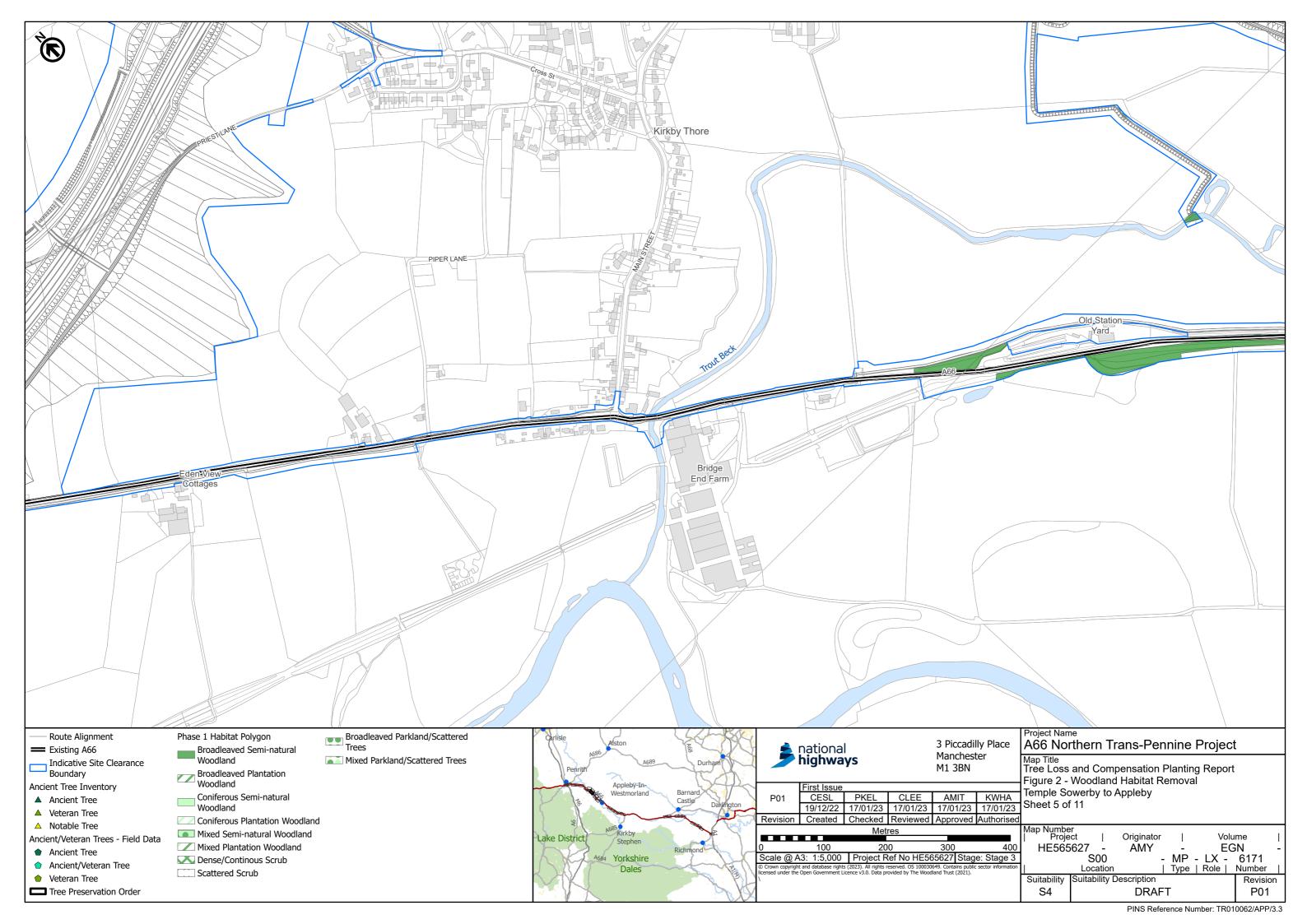


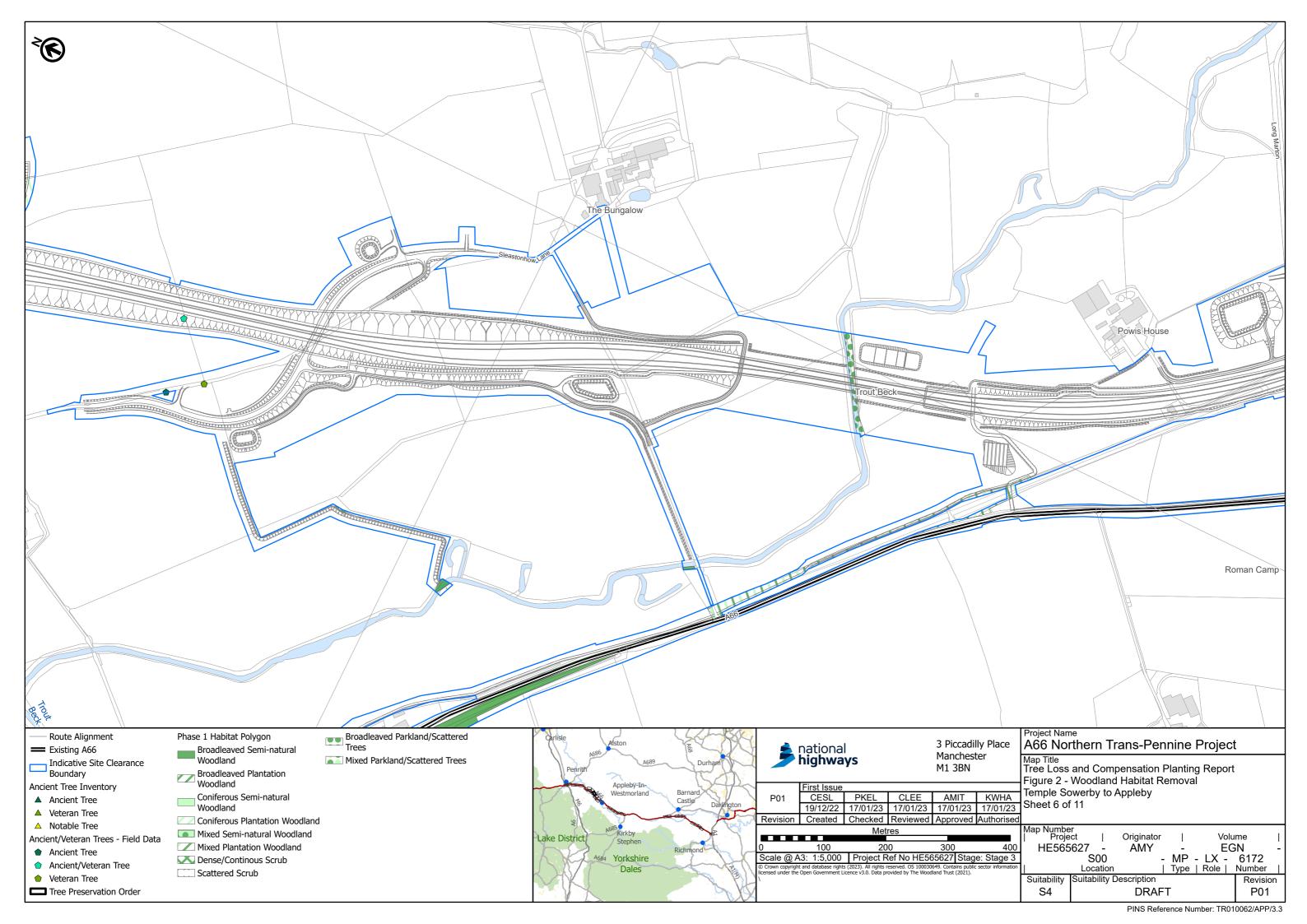


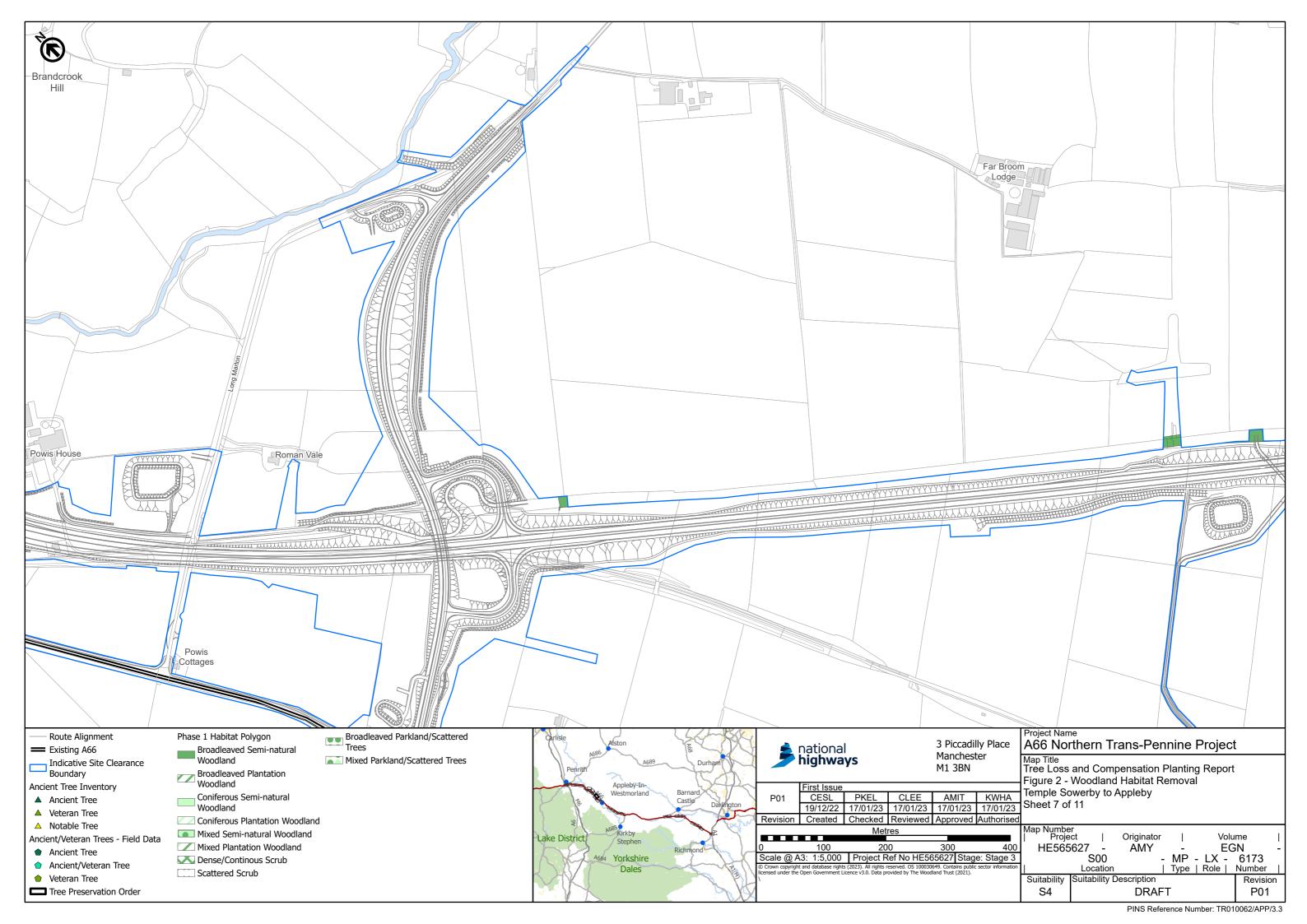


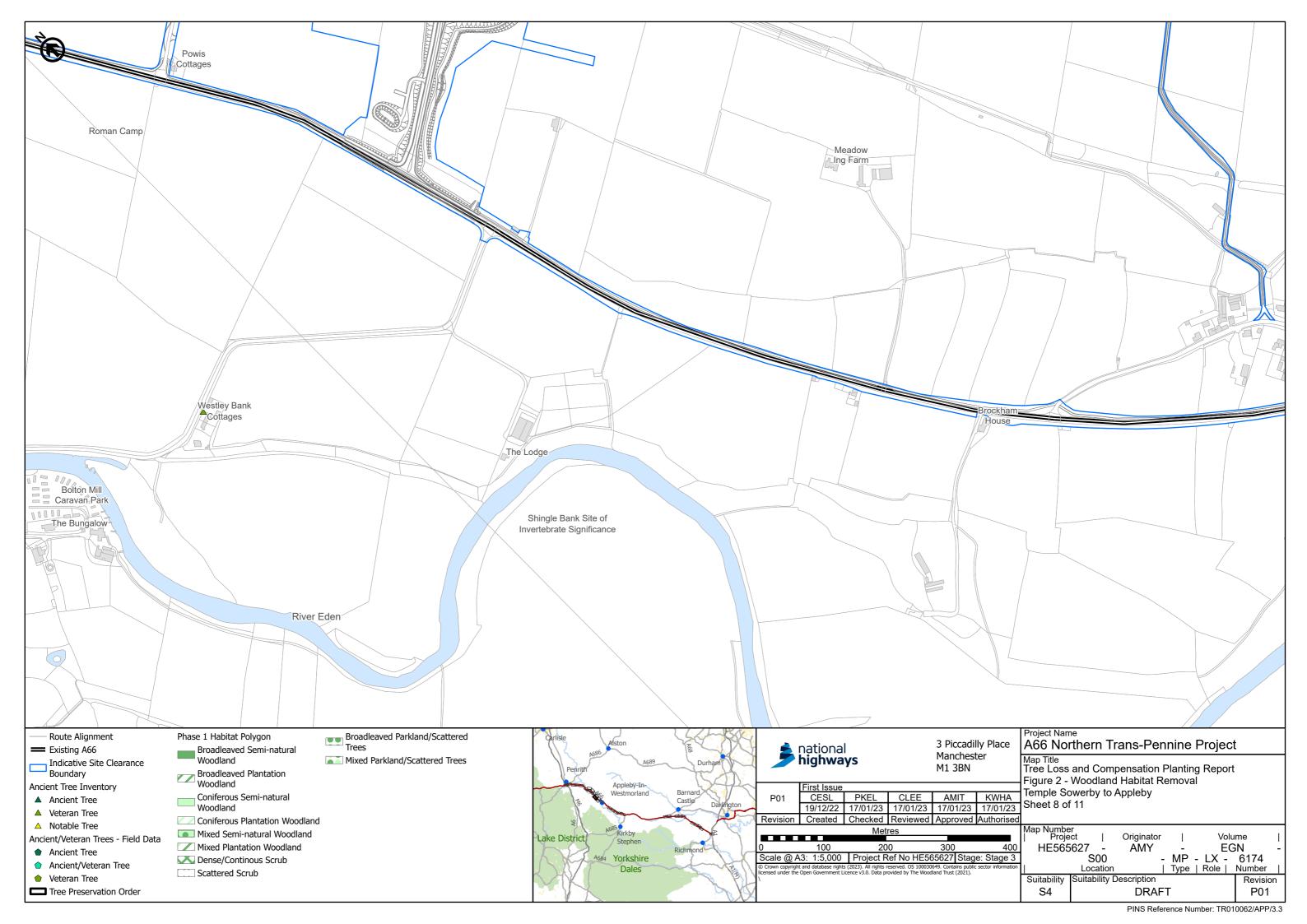


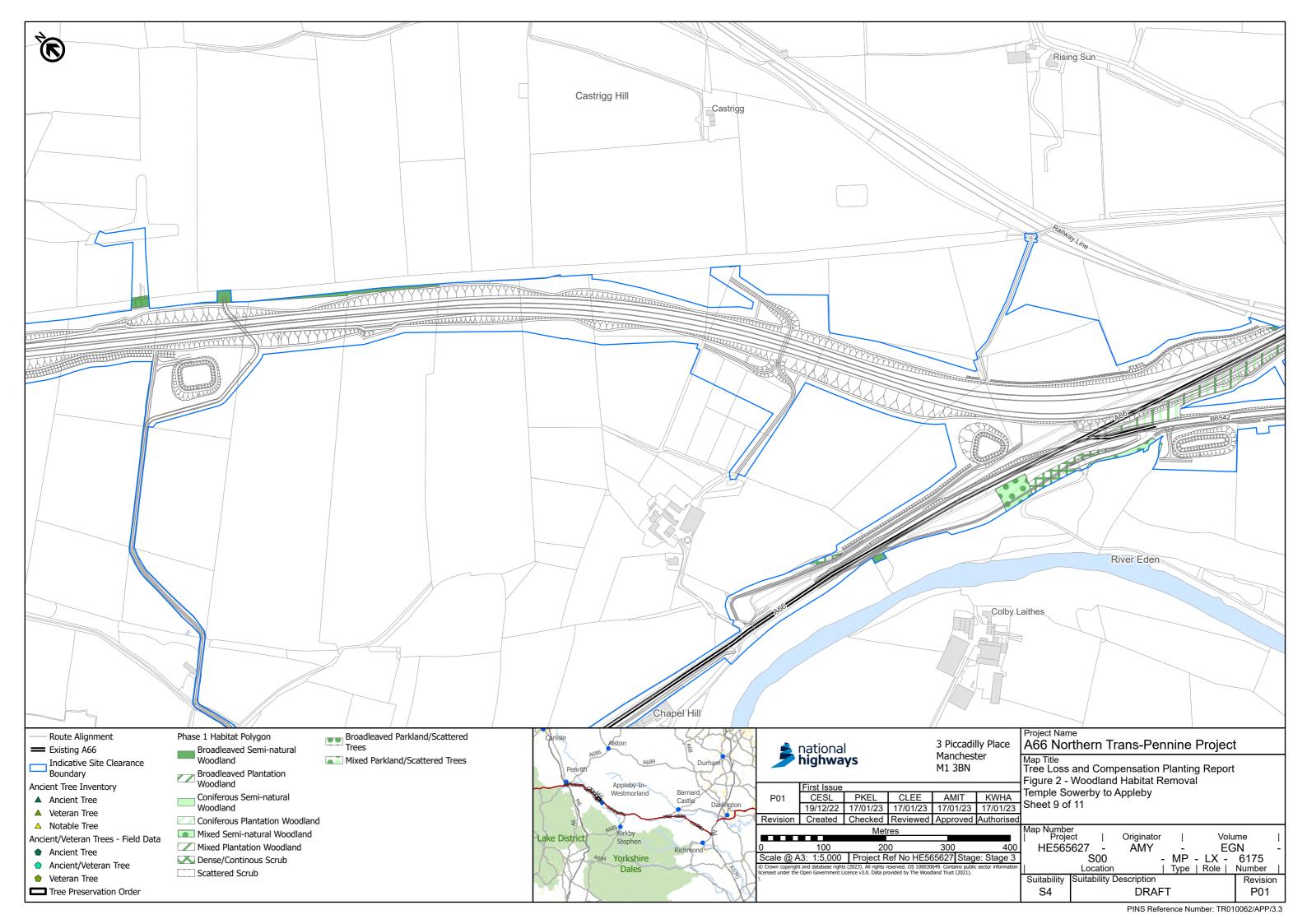


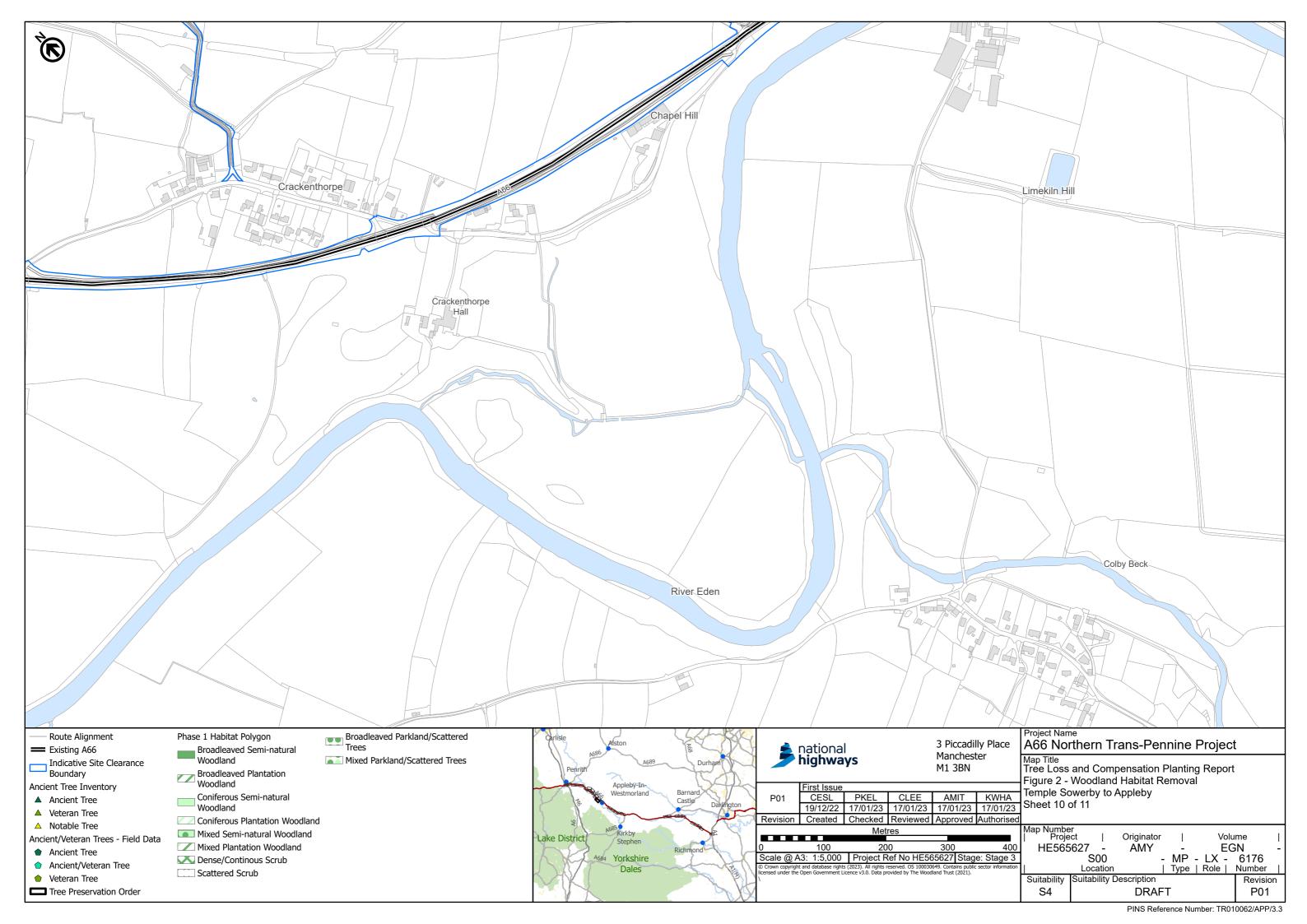


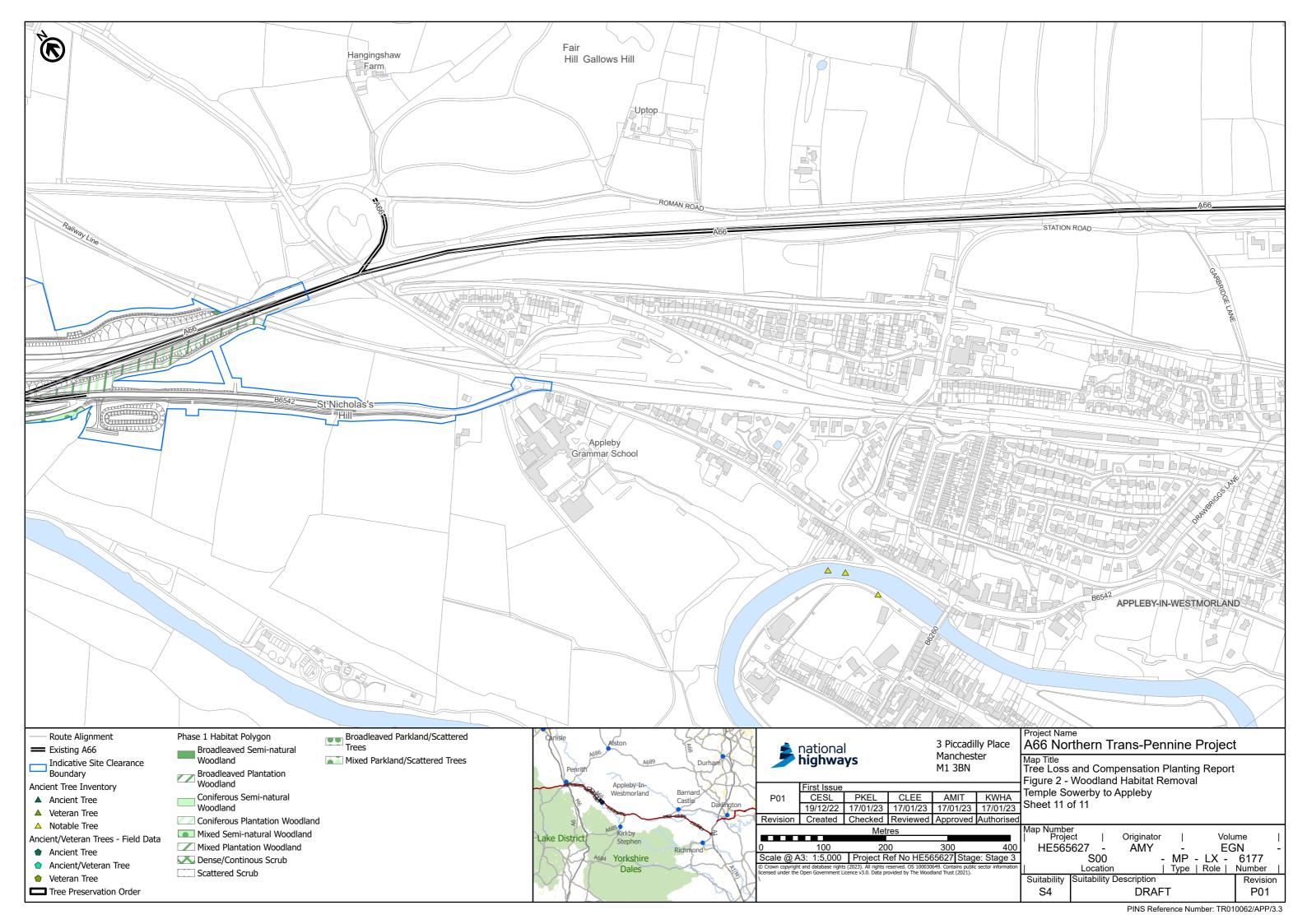


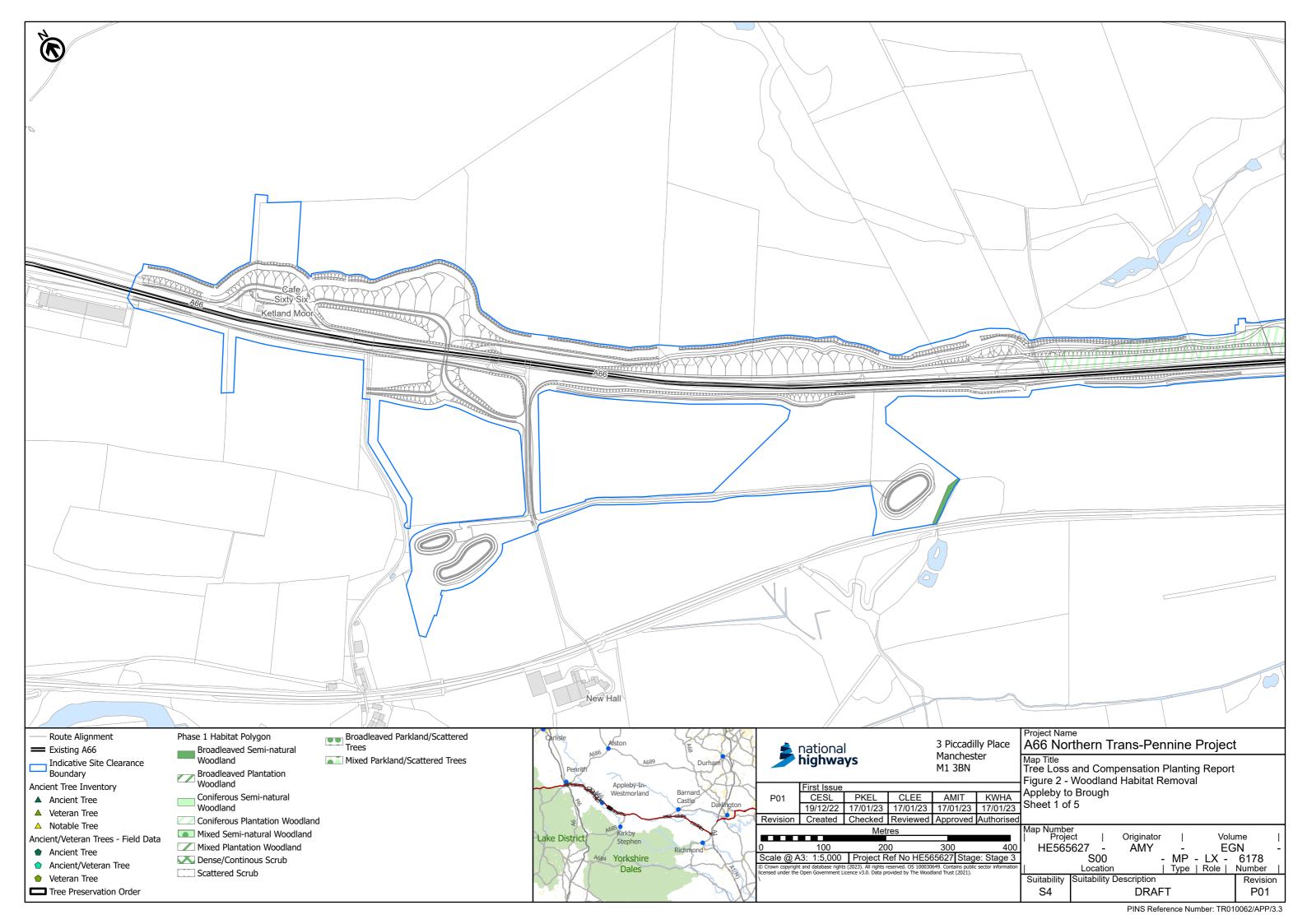


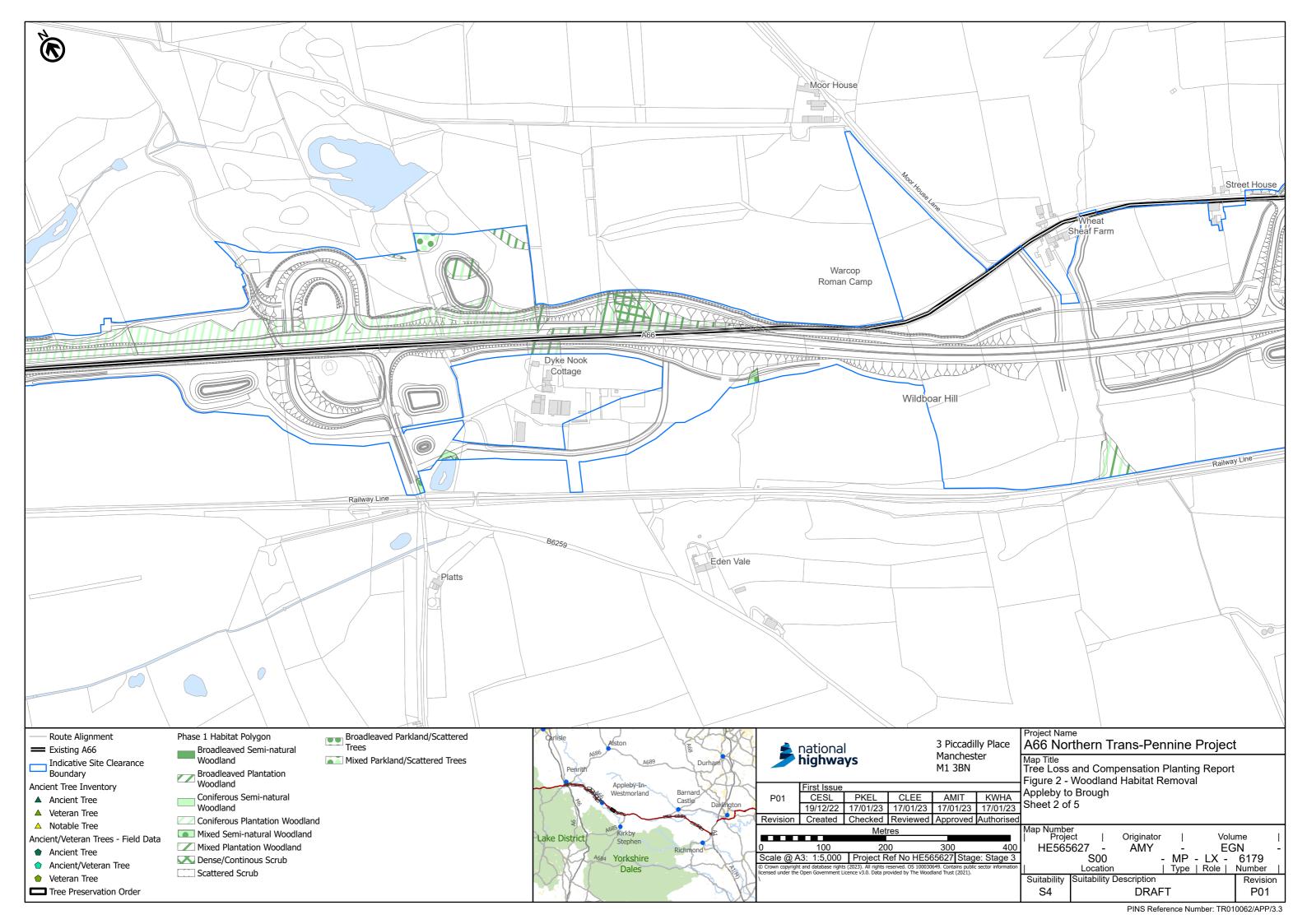


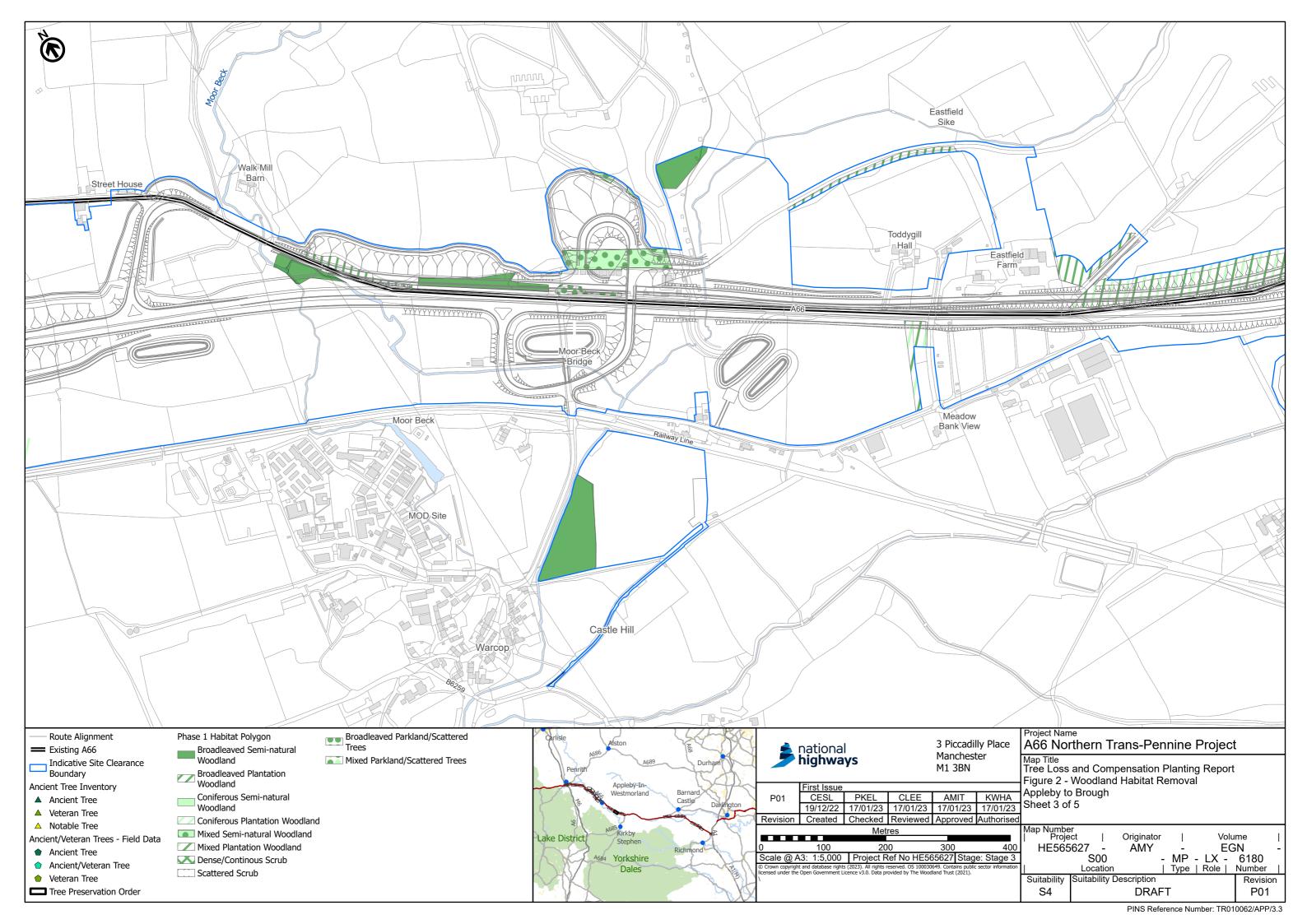


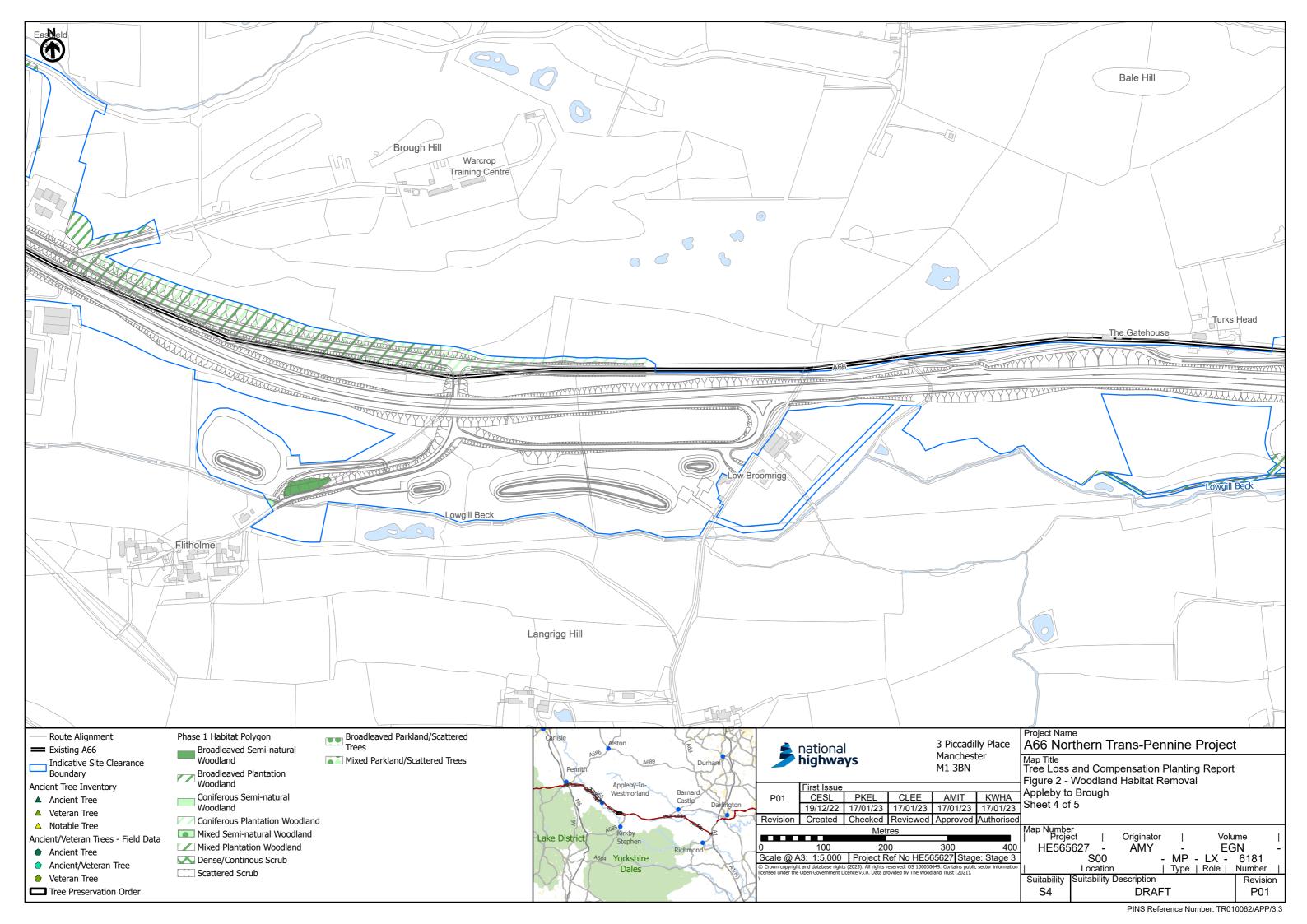


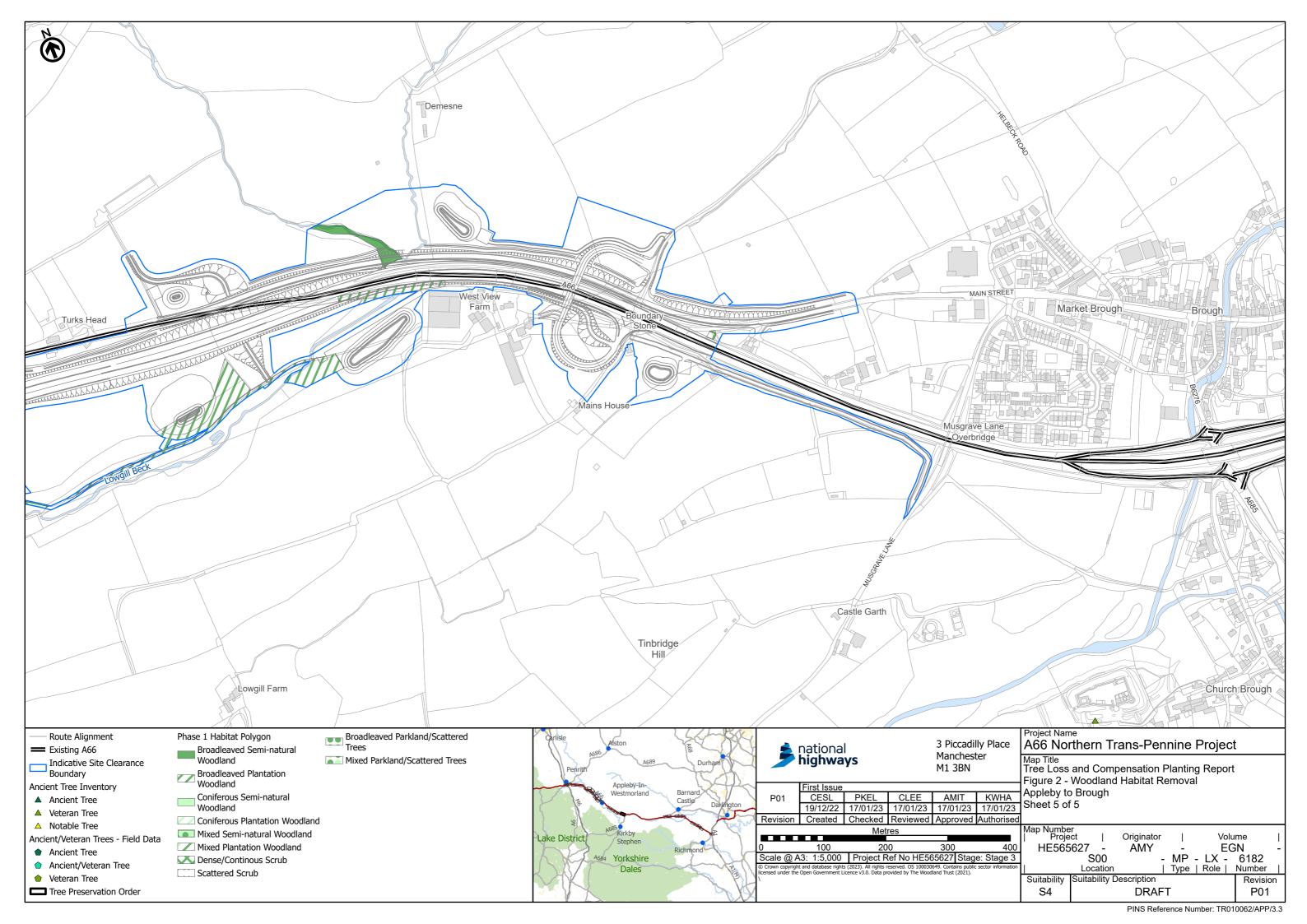


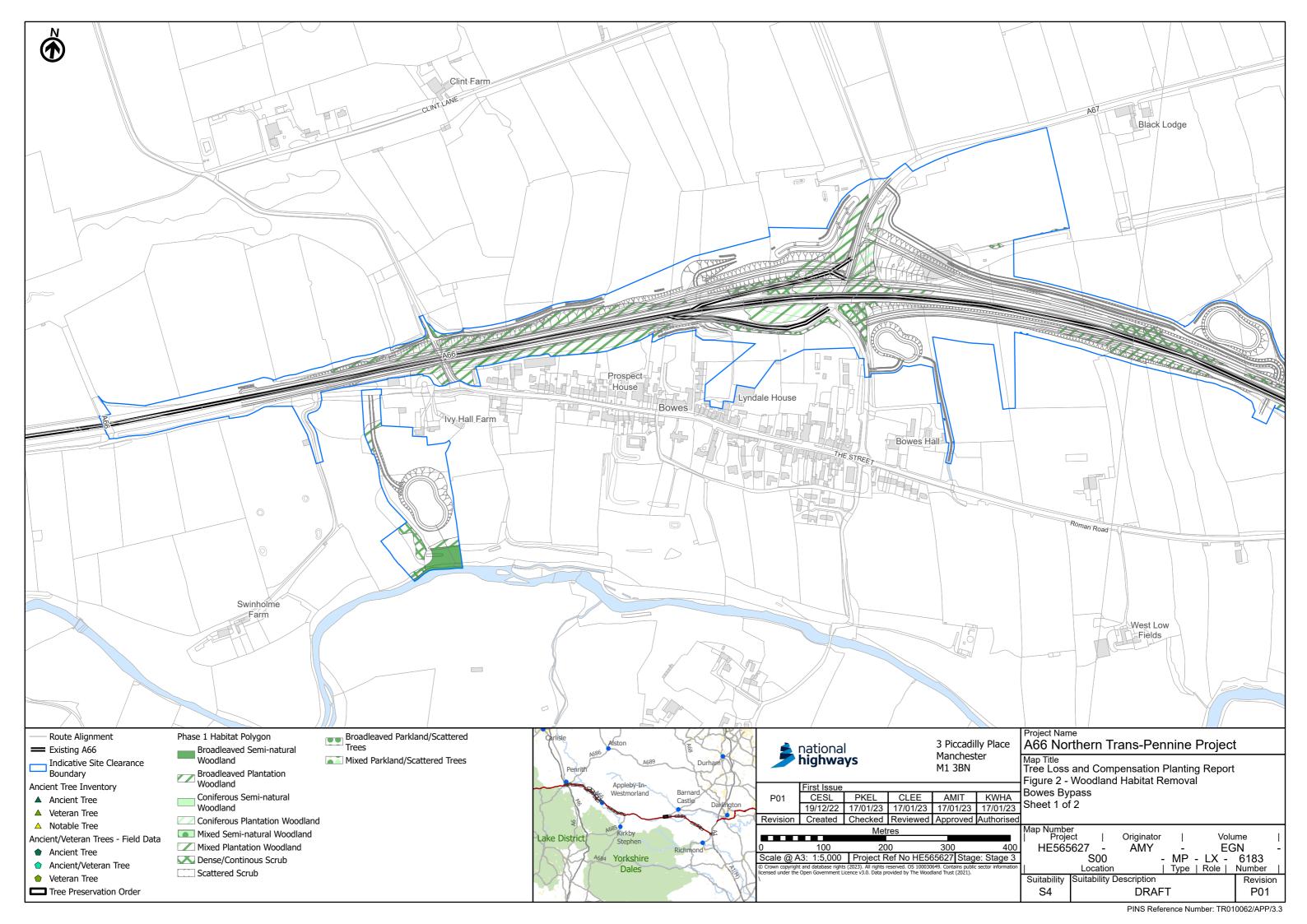


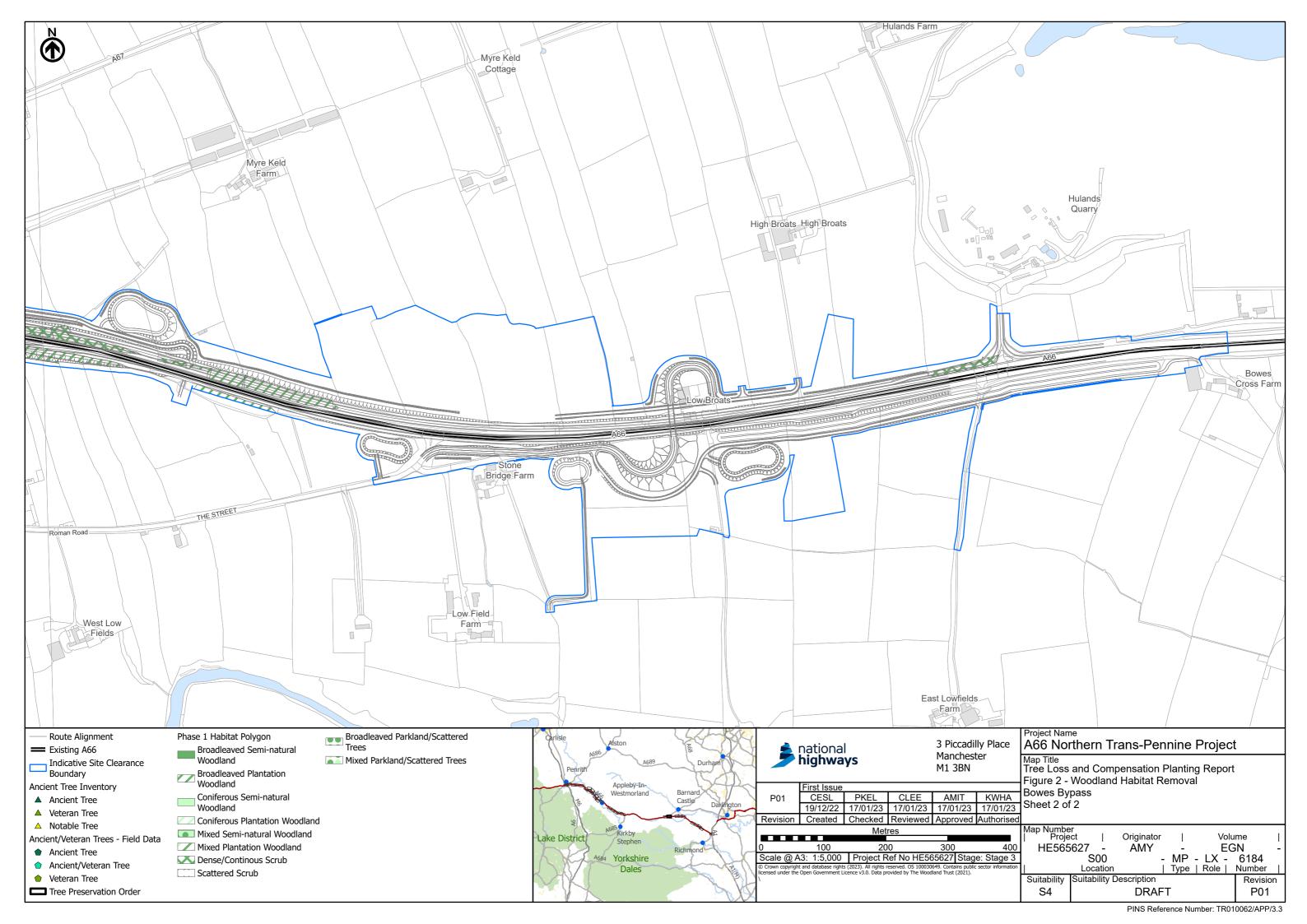


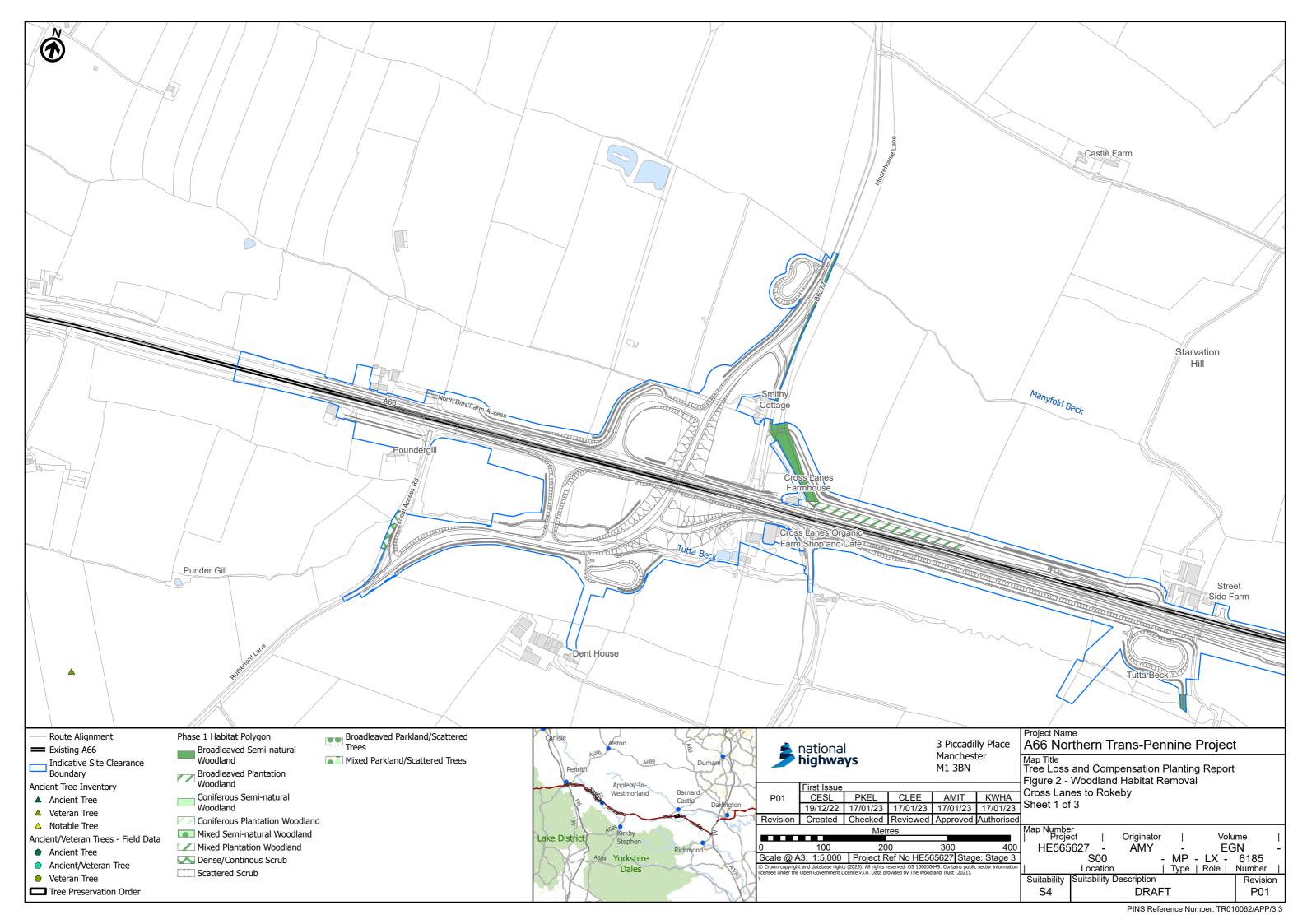


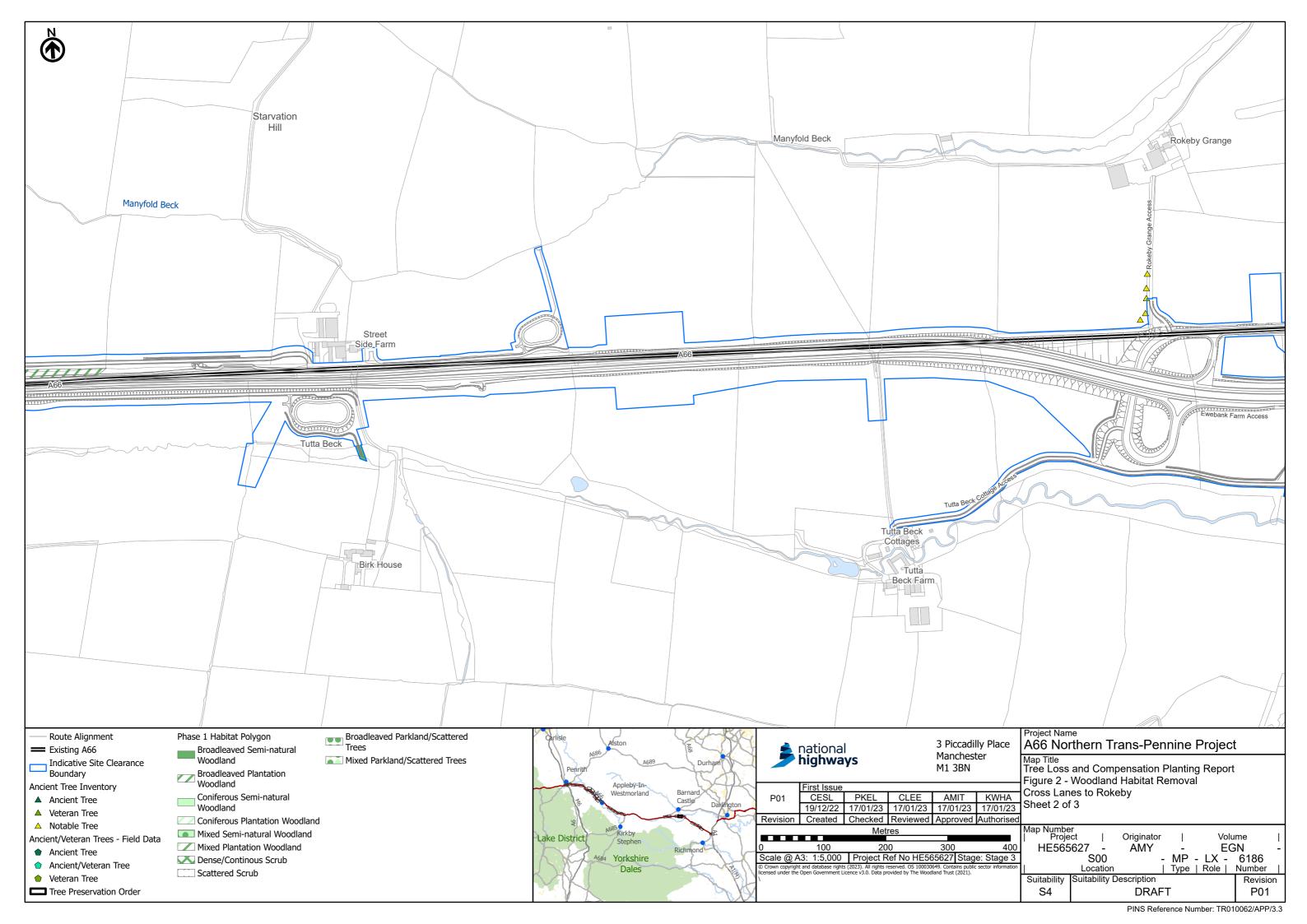


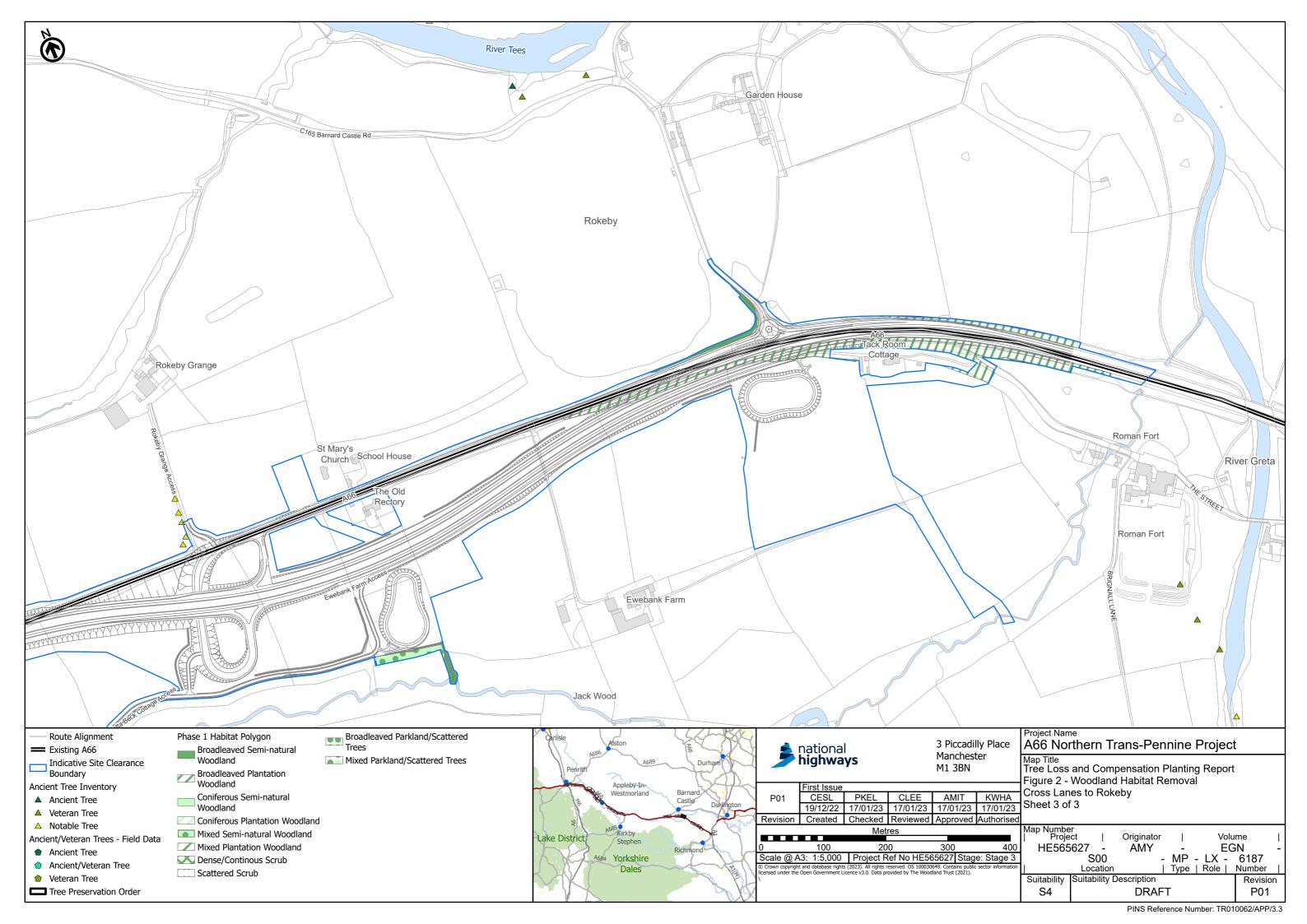


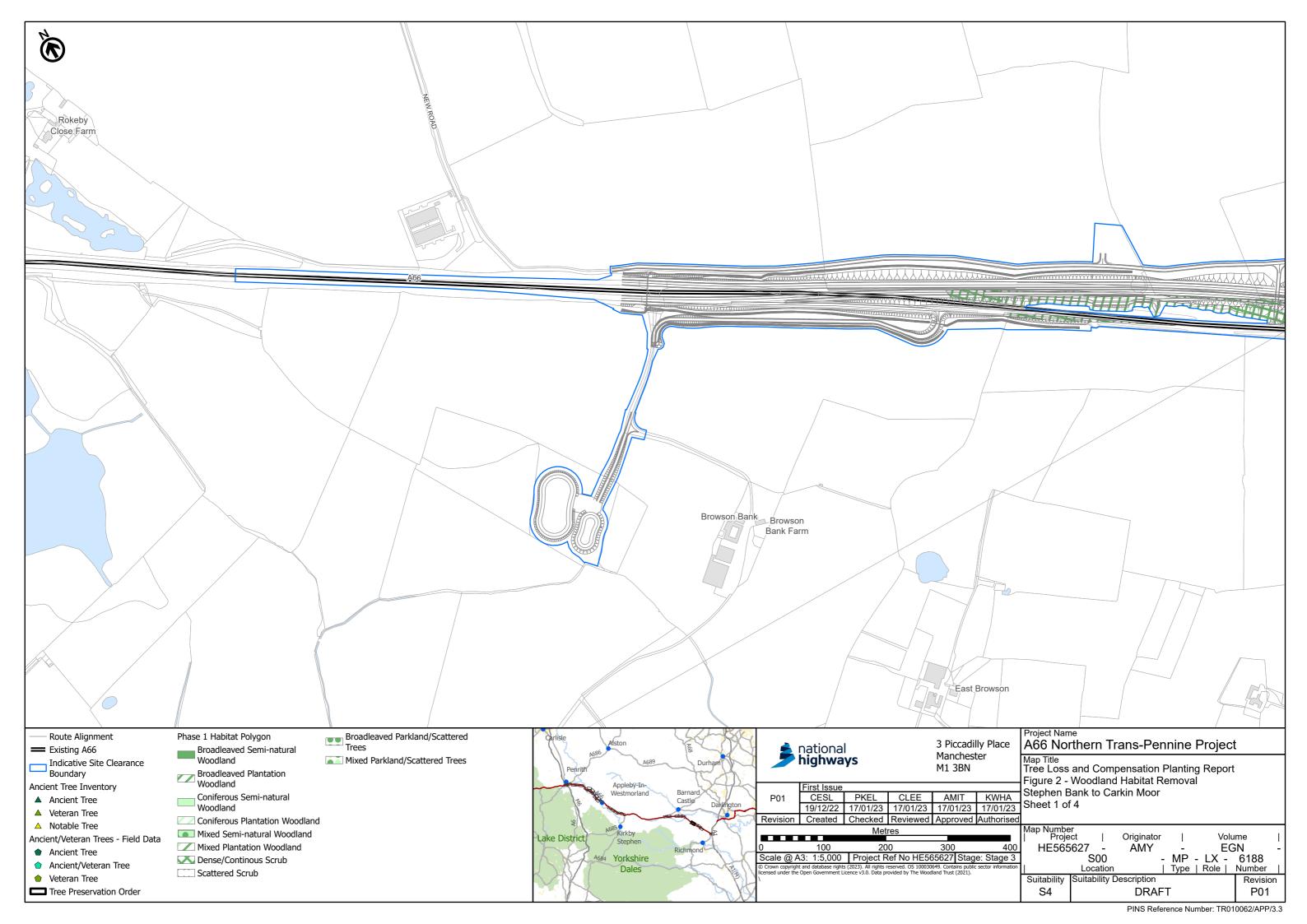


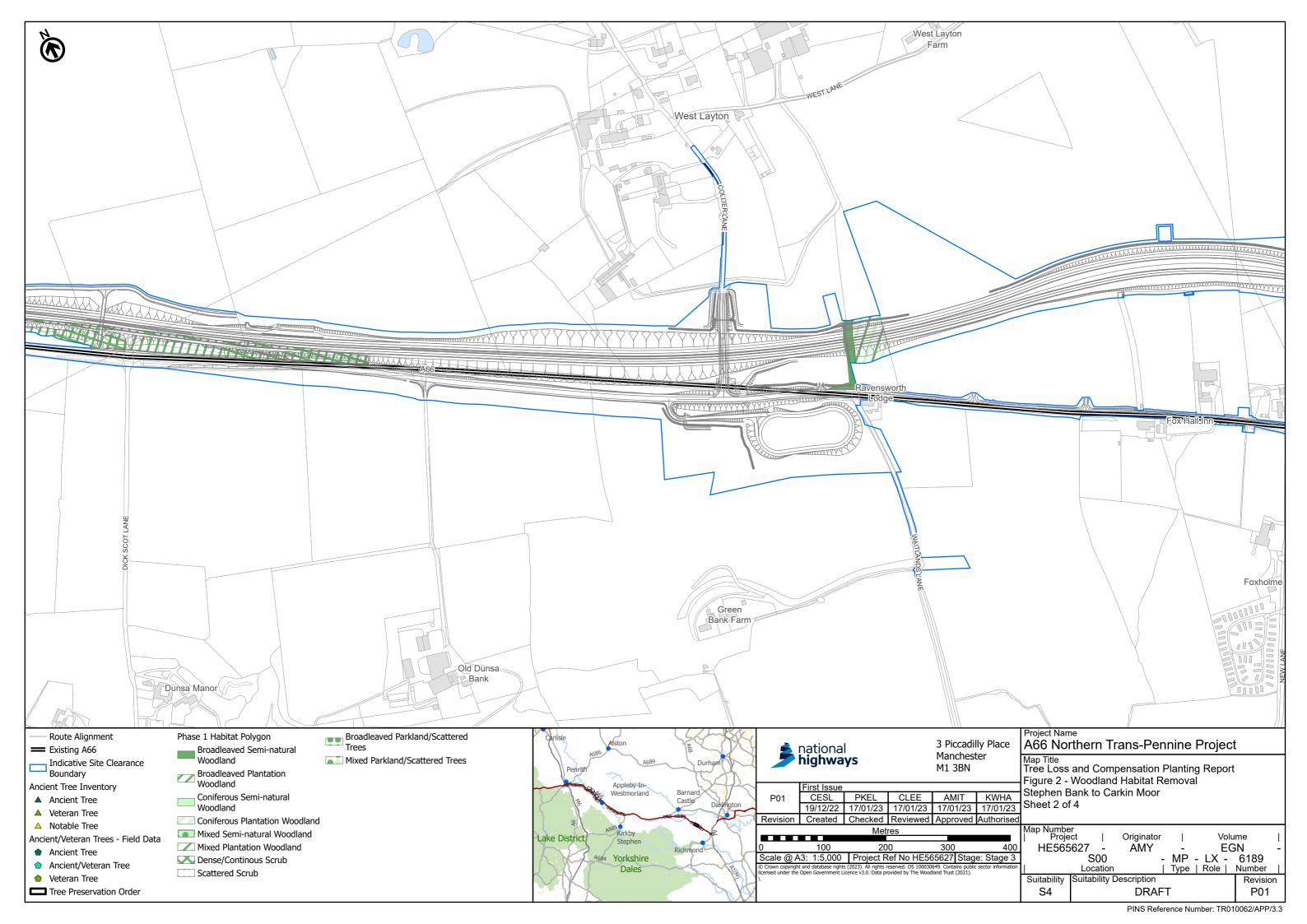


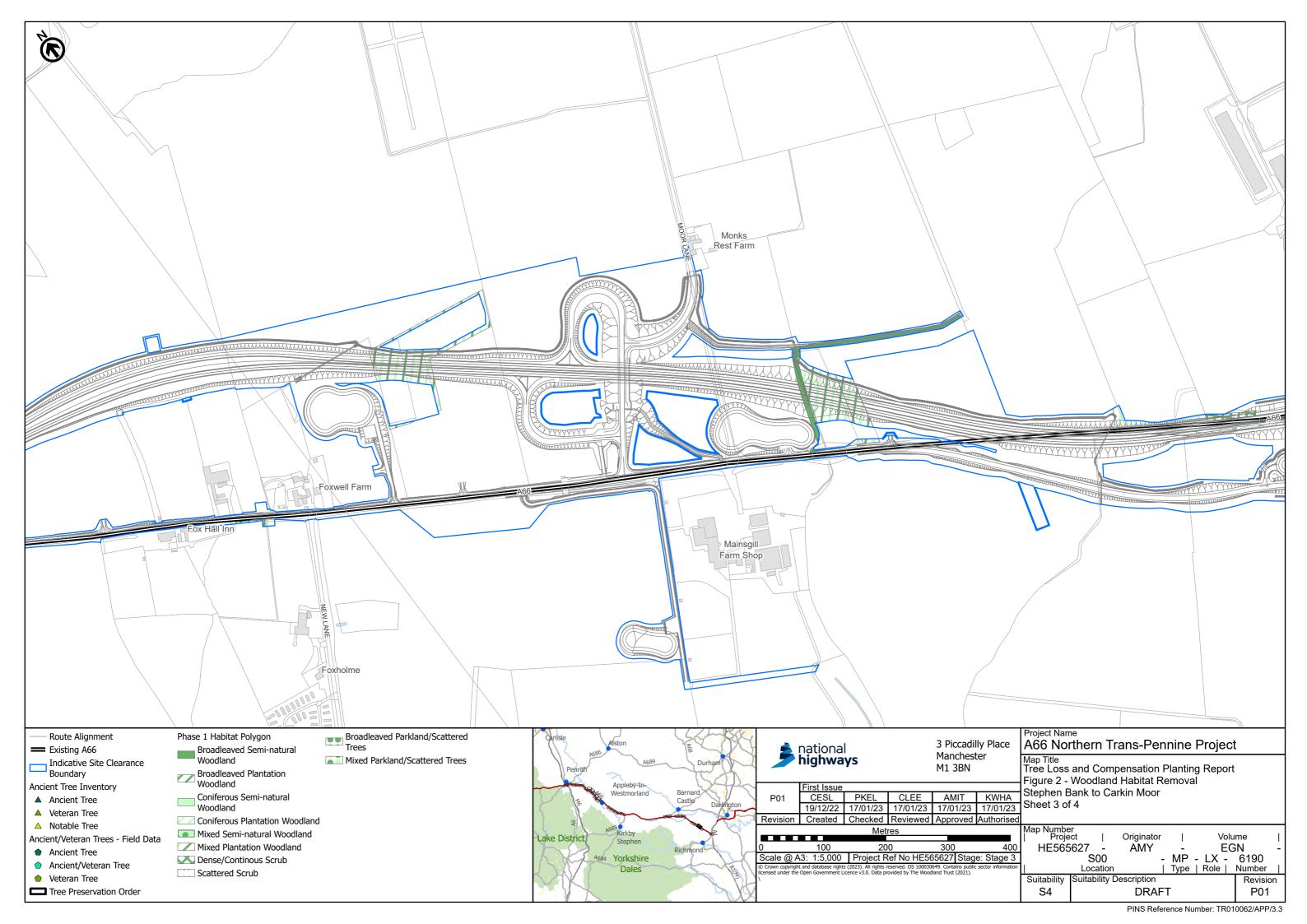


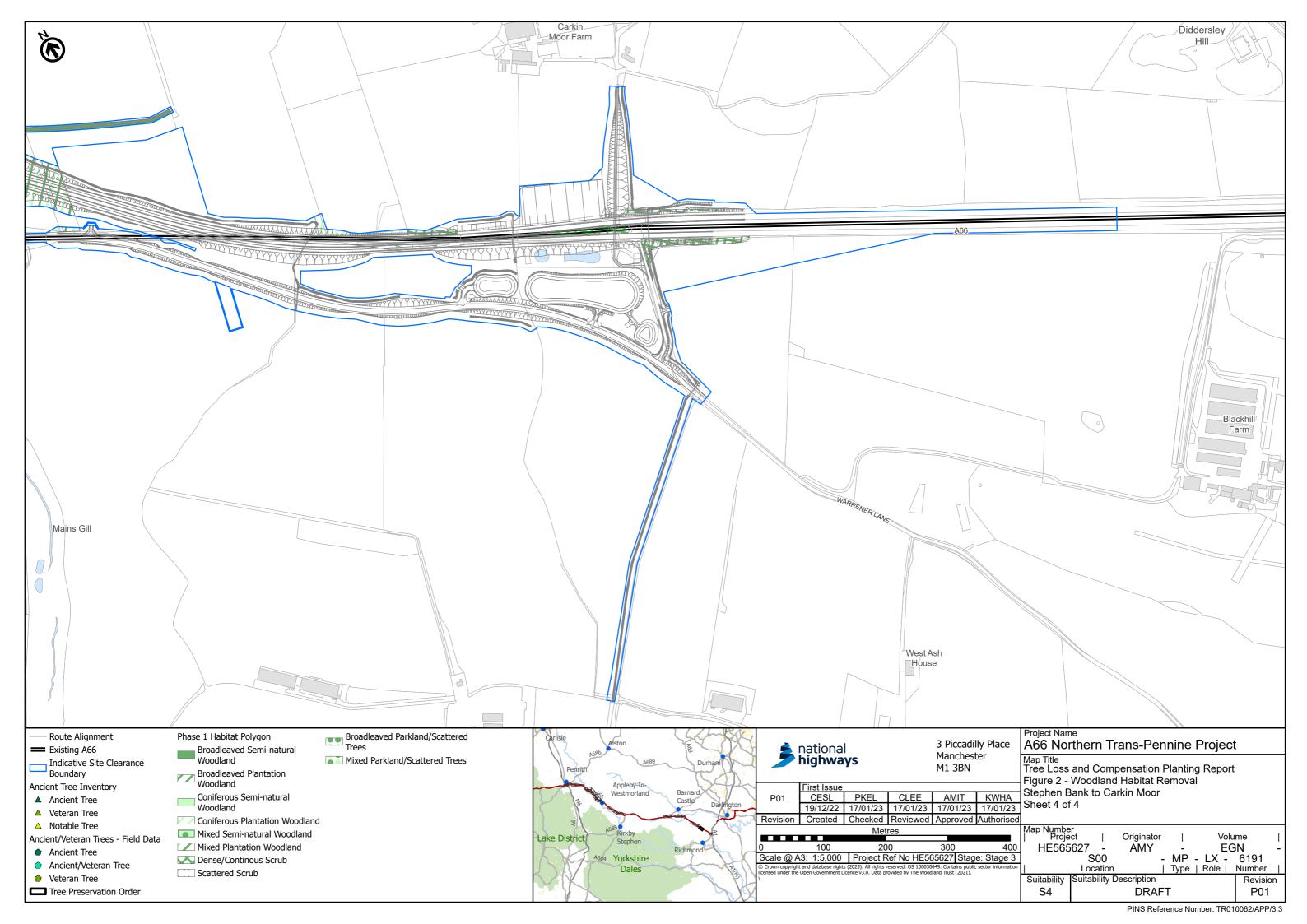


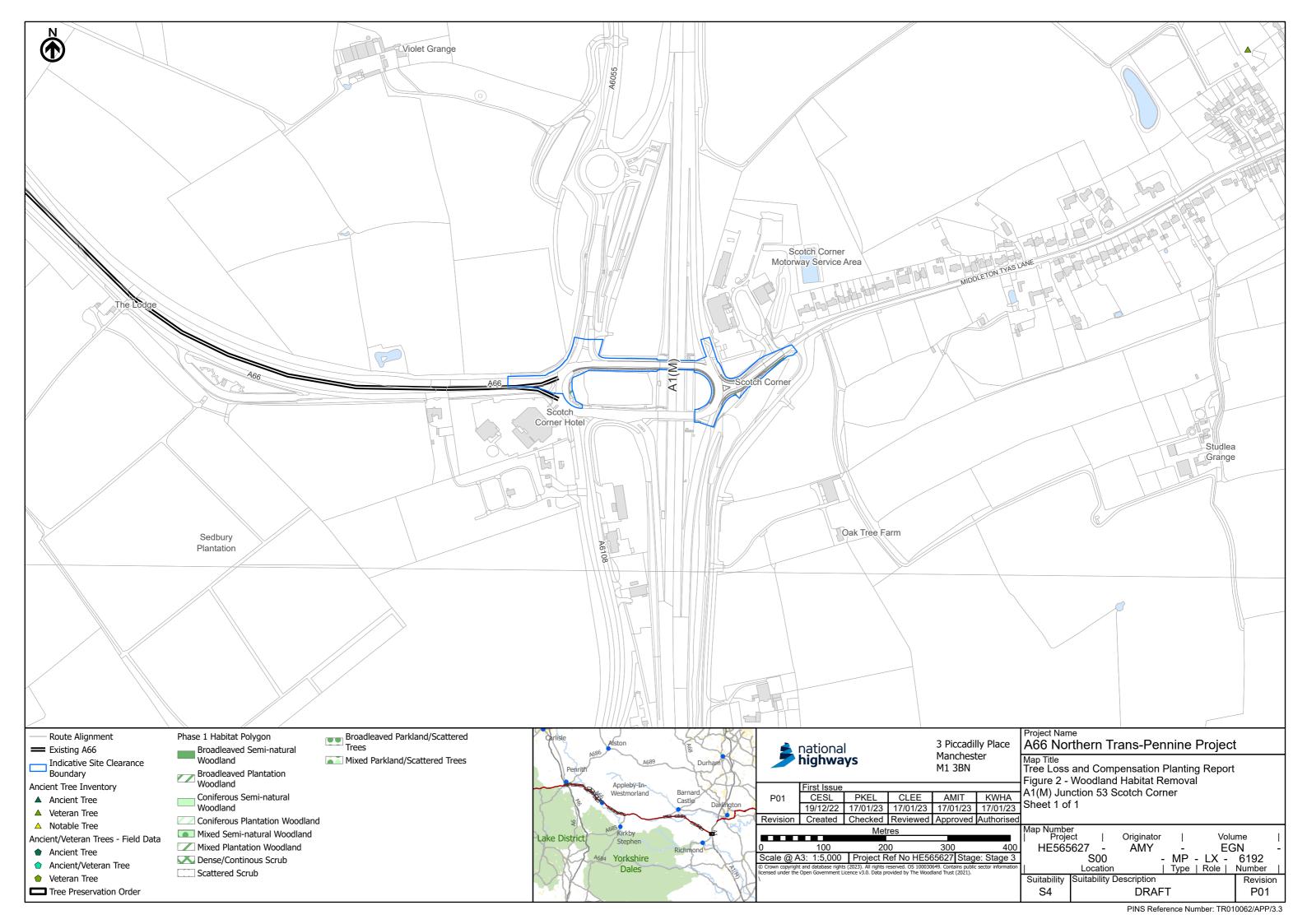














Appendix 3: Figure 3 – Woodland Habitat Replacement

