
Technical Note: A629 Phase 2 Halifax Town Centre Improvements : Biodiversity Net Gain Assessment

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Introduction

An application for planning consent has been prepared on behalf of the Borough Council of Calderdale (i.e. Calderdale Council) for the A629 Phase 2 Halifax Town Centre scheme (i.e. 'the Proposed Development') to be implemented within Halifax Town Centre, within the administrative boundaries of Calderdale Council.

The consent is sought for the proposed construction (including demolition, where necessary) and operation of a series of highway interventions within Halifax town centre. These are to be constructed in three main phases, namely; the Eastern Corridor, the Western Corridor and the Central Area. Refer to **Figure 3.1** : Planning Application Red Line Boundary attached for details.

An ecological impact assessment has been completed to support the Environmental Statement (ES) for the planning application. Subsequently, Calderdale Council Countryside Services team has requested a Biodiversity Net Gain (BNG) assessment for the Proposed Development. This final version of this Technical Note builds upon feedback received from Calderdale Council Countryside Services team¹, providing a reasoned assessment of the overall potential for the Proposed Development to achieve a net gain for biodiversity, taking into account further enhancements proposed and presents all supporting evidence. All assumptions made that support the assessment are listed within the Technical Note.

Relevant Policy and Legislative Requirements

It is government policy that planning decisions should minimise impacts on and provide net gain for biodiversity (National Planning Policy Framework, NPPF 2019). In addition, the draft Environment Bill² (published by the UK government in 2019 and reintroduced into parliament in January 2020), includes proposals to make Biodiversity Net Gain (BNG) a mandatory requirement within the planning system in England. Once enshrined in law, it proposes to require all developments³ to achieve a 10% net gain in biodiversity units relative to a site's baseline biodiversity. A number of local authorities in the UK have developed local policy relating to BNG where those local planning authorities are engaged with the recommendations of the 25 Year Environment Plan. However, there is currently no specific local policy in Calderdale (i.e. within the Replacement Calderdale Unitary Development Plan (RCUDP)) for developments to achieve BNG. The NPPF (2019 updated) is clear that sustainable development includes shifting from a net loss of biodiversity to achieving net gains for nature, and that a core principle for planning is that it should add to conserving and enhancing the natural environment and reducing pollution. Local planning authorities therefore have a duty to promote BNG through the planning system under the NPPF.

Calderdale Council is currently undergoing examination of a draft Local Plan by an inspector appointed by the Secretary of State. In due course, the new local plan will become the development plan for Calderdale and will replace the RCUDP when it is approved, which could be 2020. Until then, all planning decisions should be based on the RCUDP and NPPF. As the examination may have concluded prior to the determination of this application, its policies could be a material consideration and thus be entitled to some weight in decision making.

Policy GN3 of the emerging Local Plan sets out a list of requirements for developments to achieve better management of the natural environment. In regard to BNG, the policy states that the Council will seek to achieve better management of

¹ Email from Calderdale Council, Countryside Services (Hugh Firman) to Calderdale Council Planning (Anita Seymour) 13.05.20

² Environment Bill (2019). The House of Commons, 15 October 2019.

³ All development within the scope of the Town & Country Planning Act

Calderdale's natural environment by requiring developments to: *vi: Design-in wildlife, maximise multi-functionality and provide appropriate management, ensuring development follows the mitigation hierarchy and achieves net gains in biodiversity.*

Methodology

Desk Study Review

A review of the following reports has been undertaken to support the BNG assessment:

- **Appendix 10C_E:** Eastern Corridor Preliminary Ecological Appraisal (AECOM, 2020);
- **Appendix 10C_W:** Western Corridor Preliminary Ecological Appraisal (AECOM, 2020);
- **Appendix 10C_C:** Central Area Preliminary Ecological Appraisal (AECOM, updated May 2020);
- **Figure 10.1:** Location of Broadleaved Woodland, dense / scattered scrub and running water;
- **Appendix 12B:** Tree Survey Report (AECOM, 2020); and
- **Document 5.1:** Public Realm Design Report A629 Phase 2 Halifax Town Centre Improvements (AECOM, updated May 2020).

Biodiversity Net Gain Assessment - Basic Measurement Option

The Proposed Development site does not include or adjoin a local wildlife site or nationally designated wildlife site, or irreplaceable habitat. Given the urban nature of the Proposed Development and the associated low ecological value at baseline, a basic measurement option has been undertaken to quantify the change in biodiversity before and after development, based on Technical Note 2.8.1 of the CIRIA/CIEEM/IEMA guidance (2019). It is considered that the basic means of measuring biodiversity losses and gains is most appropriate to the Proposed Development given that the biodiversity present in the existing baseline is too small to apply the Defra Biodiversity 2.0 metric calculator tool.. The potential to achieve a net gain in biodiversity has instead been quantified based on quantum losses and gains of habitats, and consideration of potential mitigation and enhancement measures (as included and presented in the ES).

The methodology followed in the CIRIA guidance (Basic Measurement) does not include a calculation which would allow a percentage net gain to be calculated or reported. The simplified metric option in the CIRIA guidance uses a simplified equation based on habitat distinctiveness x habitat condition score x habitat area = biodiversity units. However, this calculation is not applicable to the Proposed Development, given the nature of the site, habitat losses and the proposed planting. Instead, the approach set out in this Technical Note highlights where the Proposed Development is delivering gains for biodiversity, in line with available best practice guidance.

The BNG assessment has been carried out using the baseline habitat information gathered from the existing habitat mapping and survey information, including tree survey information and desk study review, and by considering how the landscape design proposals in the Public Realm Report (AECOM, 2020) will affect biodiversity in the future, with the Proposed Development. The final version of this Technical Report draws upon updated proposals for habitat creation and enhancement detailed in the updated Public Realm Design Report (AECOM May 2020). It presents the findings of the BNG assessment, setting out predicted losses and gains for those habitats assessed in the ES (in line with best practice methodology within Technical Note 2.8.1 of the 2019 CIRIA/CIEEM/IEMA guidance).

Technical Note 2.8.1 states that for a basic measurement option, there are several ways to quantify change in biodiversity before and after development. The following basic measurements have been applied (where applicable) as per Technical Note 2.8.1:

- area, linear measure or number (e.g. in terms of trees) of habitat lost, retained and created;
- a list of key plant species (particularly native species) present before and after the development;
- a list of structures and functions provided to wildlife, before and after the development (e.g. nesting or roosting boxes, habitats generating food such as berries, perches, places for species to overwinter or hibernate such as log piles) and the species for which these structures and functions are beneficial;
- a demonstrable positive change in site management for biodiversity secured as a result of the development, for example the loss of close mown amenity grassland has been replaced with wildlife verges that will be managed to allow flowering and seeding prior to cutting; and
- the positive benefits of the development in terms of local biodiversity targets for example contributing a percentage of habitat creation towards a target or new habitat features for target species, so any loss of habitat as a result of the development will need to be factored in.

Assumptions and Limitations

This Technical Note is based on the following assumptions:

- There are some very small (<0.004ha) sections of boundary habitat where the GIS data and OS Mastermap do not align on the Phase 1 habitat map. In such small areas, an assumption has been made that the habitats will be retained – aligning with the environmental impact assessment for biodiversity.
- Areas of existing ornamental planting and amenity grassland have not been mapped. In consultation with the Landscape Team and by review of aerial photography, areas of new ornamental planting proposed have been reviewed.
- The basic measurement option does not include baseline habitats of less than local value (e.g. amenity grassland and ornamental planting). However, assumptions have been made as appropriate and a comparison on their plant species composition and functionality for wildlife before and after has been made.

Results

Basic Measurement

Baseline Habitats

Table 1 provides a summary of the habitat and losses and gains for the Proposed Development, based on the environmental assessment. Other BNG considerations are presented in Table 2.

Table 1: Basic Habitat Losses and Gains

Habitat type (from Figure 10.1: Phase 1 habitat survey; Table 10.5 of ES Chapter 10: Ecology; and Appendix 12B: Tree Survey Report)	Proposed Development Area				Importance of biodiversity feature	Habitat loss (hectares ha/ length metres m / No.) (approx.)	New habitat (from Landscape Public Realm Design Report Figures	Habitat gain (hectares ha/ length metres m / No.) (approx.)	Net permanent habitat gain (Gain – loss) (approx.)	Notes
	Central Area	Eastern Corridor	Western Corridor	Cripplegate						
Hard-standing, buildings	✓	✓	✓	✓	Site / Negligible	N/A	N/A	N/A	N/A	The Proposed Development site is dominated by hard surfaces and buildings. Habitat scoped out of the ecological impact assessment; habitat area before and after not calculated.
Amenity grassland	✓	✓	✓	✗	Site / Negligible	N/A	N/A	N/A	N/A	Habitat scoped out of the ecological impact assessment; habitat area before and after not calculated.
Ornamental Planting	✓	✓	✓	✗	Site / Negligible	N/A	Ornamental planting to Q31.	<0.1ha	+<0.1ha	932m ² (<0.1 ha) of new ornamental planting is proposed (replacing areas of amenity grassland and hardstanding).
Scattered Trees (Street Trees)	✓	✓	✓	✓	Local	51No.	Proposed Tree with Grille to Q31 Existing Tree Retained and Protected to BS5837:2012.	135No.	+84No.	A total of 164No. trees are present within the Proposed Development boundary. Of these, 51No. trees are to be removed and 113No. trees are to be retained; a further 135No. trees are to be planted resulting in a permanent net gain of 84No. trees. Refer to Appendix A, Planting Information for details

Habitat type (from Figure 10.1: Phase 1 habitat survey; Table 10.5 of ES Chapter 10: Ecology; and Appendix 12B: Tree Survey Report)	Proposed Development Area				Importance of biodiversity feature	Habitat loss (hectares ha/ length metres m / No.) (approx.)	New habitat (from Landscape Public Realm Design Report Figures	Habitat gain (hectares ha/ length metres m / No.) (approx.)	Net permanent habitat gain (Gain – loss) (approx.)	Notes
	Central Area	Eastern Corridor	Western Corridor	Cripplegate						
Broadleaved woodland	✓	✗	✗	✗	Local	0ha	N/A	N/A	0 ha	There is an area of broad-leaved woodland within the Central Area (approx. 0.07ha) which will be retained.
Dense Scrub	✗	✓	✗	✗	Local	0ha	N/A – see ornamental planting above.	N/A – see ornamental planting above.	N/A – see ornamental planting above.	Dense scrub is present within the vicinity of Bank Bottom (0.02ha) which will be retained.
Scattered Trees and Scrub	✗	✗	✗	✓	Local	-0.3ha	Not landscaped – left to regenerate	0.22ha	-0.08ha	Approx. 1.36ha of scattered scrub and trees at Cripplegate is to be retained. 0.3ha will be impacted for the construction compound; of which 0.22ha will be left to regenerate/ naturally colonise post construction. There will be a permanent net loss of 0.08ha of scattered trees and scrub.
Invasive Non-Native Plant Species	✗	✓	✗	✗	Legally protected	0ha	N/A	N/A	0 ha	There are two areas of invasive non-native plant species; wall cotoneaster <i>Cotoneaster horizontalis</i> (0.01ha) and Himalayan balsam <i>Impatiens glandulifera</i> (0.003ha). A management plan for non-native invasive plant species will be prepared to ensure these species are not allowed to spread during the proposed construction works.
Running water	✗	✓	✗	✓	Local	-4.5m	None	None	- 4.5m	Hebble Brook is an open channel for approximately 170m before entering into culvert. The culvert bridge will be increased in length by 4.5m resulting in a permanent loss of 4.5m of open channel. However, it is noted that value of the watercourse at this location for biodiversity is limited. No aquatic vegetation was observed within the channel during surveys; and the brook was fast flowing with a brick bed and vertical brick embankments. Refer to structure and functions provided for wildlife below.
Hedgerows	✓	✗	✗	✗	Not assessed – new created habitat	0m		105	+105m	There is no existing hedgerow habitat within the Proposed Development boundary. New hedgerow will be planted at Winding Road, providing a net gain of 105m. The species chosen has been agreed, following discussions with Calderdale Council Countryside

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	Central Area	Eastern Corridor	Western Corridor	Cripplegate						
										Services (refer to Document Ref. 5.1 : Public Realm Design Report, Part 7 of 8 (May 2020).
Species Rich Grassland	✗	✓	✗	✓	Not assessed – new created habitat	0m	+0.15ha		+0.15ha	Following discussions with Calderdale Council Countryside Services, this is new habitat proposed to provide further biodiversity enhancement. For planting detail, refer to Document Ref. 5.1 : Public Realm Design Report, Part 8 of 8 (May 2020).

Table 2: Other BNG considerations

BNG Consideration	Before development	After Development
Key plant species – Street Trees	Tree species present (and proposed to be removed) include: - Willow sp. <i>Salix</i> sp. (N) - Cherry sp. <i>Prunus</i> sp. (N) - Norway maple <i>Acer platanoides</i> - Birch sp. <i>Betula</i> sp. (N) - Lime sp. <i>Tilia</i> sp. (N) - Common hornbeam <i>Carpinus betulus</i> (N) - Maple sp. <i>Acer</i> sp. - Whitebeam <i>Sorbus</i> sp. - Sycamore <i>Acer pseudoplatanus</i> - Black locust <i>Robinia pseudocacia</i> - Elder <i>Sambucus nigra</i> (N) 6No. of which are native species⁴. It should be noted that conservative assumptions have been applied (e.g. assuming that all cherry trees lost are native) in Appendix A.	Native tree planting proposed includes the following species. <i>Quercus robur</i> 'Fastigiata' (Oak) <i>Betula pendula</i> "Fastigiata" (Birch) Other non-native street trees are to be drought, disease and pollution tolerant species, providing future resilience to climate change. The species selected follow the Landscape Institute Biosecurity toolkit⁵. Species to be planted comprise*: <i>Acer platanoides</i> 'Columnare' <i>Acer platanoides</i> 'Crimson King' (Norway Maple) <i>Amelanchier lamarkii</i> <i>Betula nigra</i> "River Birch" <i>Betula utilis</i> 'Jacquemontii' <i>Betula pendula</i> 'Purpurea' <i>Corylus colurna</i> (Turkish Hazel) <i>Liquidamber styraciflua</i> <i>Prunus</i> 'Sunset Boulevard' <i>Liquidamber styraciflua</i> (Sweet Gum) <i>Liriodendr tulipon</i> 'Faastigiatum' <i>Pinus nigra</i> (Austrian Pine) <i>Prunus</i> 'Amanagowa' <i>Prunus</i> 'Sunset Boulevard' <i>Prunus</i> 'Sunset Boulevard' (Ornamental) <i>Sorbus aucuparia</i> 'Autumn Spire' <i>Sorbus aucuparia</i> 'Cardinal Royal' Mountain ash <i>Sorbus aucupria</i> is also fruit bearing of benefit to foraging wildlife e.g. birds.
Key plant species – Ornamental planting	Not recorded.	New areas of shrub to be planted. No native shrub species are included in the planting design. However, species chosen are of potential value as a source of pollen/nectar to bees, butterflies, moths, and other pollinating insects. New areas of ornamental planting include the following*: (P = Royal Horticultural Society RHS Plants for Pollinators⁶) <i>Achillea</i> 'Gold Plate' (P) <i>Agapanthus</i> Headbourne Hybrid <i>Allium schoernprasm</i> (P) <i>Aster x frikartii</i> 'Wunder Von Stafa' <i>Astilbe chinensis</i> 'Davidii' <i>Bergenia</i> <i>overture</i> (P) <i>Calamagrostis</i> 'Karl Foerster' <i>Cornus alba</i> 'Sibirica' (P) <i>Deschampsia cepitosa</i> 'Goldtau' <i>Echinacea purpurea</i> (P) <i>Echinops</i> 'Vietch's Blue' <i>Eryngium x tripartitum</i> (P) <i>Foeniculum vulgare</i> 'Purpurea' (P) <i>Iris pseudacorus</i>

⁴ D Kent (2010) UK Plant list (with Stace amendments)

⁵ Plant Health and Biosecurity: The Landscape Consultant's Toolkit. LI Technical Guidance Note 01/19:

<https://landscapewpstorage01.blob.core.windows.net/www-landscapeinstitute-org/2019/04/tgn-2019-01-biosecurity-toolkit.pdf>

⁶ RHS Plants for Pollinators: <https://www.rhs.org.uk/science/conservation-biodiversity/wildlife/plants-for-pollinators>

BNG Consideration	Before development	After Development
		• <i>Iris sibirica</i> • <i>Kniphofia</i> 'Percy's pride' • <i>Leucanthemum x superbum</i> 'Wirral Supreme' • <i>Melissa officianalis</i> • <i>Mentha arvensis</i> • <i>Miscanthus sinensis</i> 'Graccillimus' • <i>Molinia cerulea</i> 'Transparent' • <i>Monarda</i> 'Cambridge Scarlet' • <i>Narsissus</i> 'Pheasant's Eye' • <i>Ophiopogon nigrescens</i> • <i>Panicum virgatum</i> 'Rehbraun' • <i>Pennisetum Villosum</i> • <i>Penstemon</i> 'Raven' (P) • <i>Perovskia</i> 'Blue Spire' • <i>Persicaria amplexicaulis</i> 'Firedance' • <i>Rudbeckia</i> 'Goldstrum' (P) • <i>Tulipa c. chrysantha</i> • <i>Veronica longifolia</i>
Key plant species - Hedgerows	None	New hedgerow planting will comprise 105m of hazel <i>Corylus avellana</i> , a locally native species.
Structures and functions provided to wildlife*	Bats • Three bat roosts were identified adjacent to the Eastern Corridor. • Low levels of bat activity of common and widespread species within the Proposed Development site boundary during transect and remote detector surveys. Birds • There are habitats within and adjacent to the Proposed Development site that could support breeding birds in the form of scattered trees, broad-leaved woodland, scrub and buildings. • Peregrine nest site adjacent to the Proposed Development. Invertebrates • Records were received for a number of moth species although none are from within the Proposed Development site. The majority of habitat comprises roads and building offering limited habitat for terrestrial invertebrates. Terrestrial invertebrates could be present within the Cripplegate/ Bank Bottom/ Berry Lane (E07/08/09B) intervention. Hebble Brook • Located within the Calderdale Wildlife Habitat Network. • Hebble Brook is currently of moderate ecological potential (i.e. less than good) with regards to the WFD; but is currently meeting good chemical potential⁷.	Bats • Bat roosts are to be retained as the Proposed Development no longer directly impacts on roost sites. • New tree and ornamental planting proposals will provide foraging habitat for bats. • Lighting strategy for bats reviewed alongside Bat Conservation Trust Guidance Note 8 Bats and artificial lighting (2018). • Foraging habitat in the form of broad-leaved woodland and dense scrub within vicinity of Cripplegate/ Bank Bottom/ Berry Lane (E07/08/09B) and Charlestown Road (E14C) interventions will be retained. Birds • Trees, hedgerows and ornamental planting proposed provides nesting and foraging habitat for birds. • Peregrine nest site on land adjacent to the Proposed Development not affected, and impact avoidance measures included in ES for this species. Invertebrates • Ornamental planting proposals and species rich grassland will benefit invertebrates/ pollinators. • Natural succession regeneration will be allowed to take place where the area of scattered trees and scrub is temporarily lost for the construction compound at Cripplegate. This mitigation is considered sufficient to ensure habitat will still be available for invertebrates. Hebble Brook

⁷ AECOM (2020) Water Chapter 9 A629 Phase 2 Halifax Town Centre Environmental Statement Vol 1.

BNG Consideration	Before development	After Development
		- This watercourse still functions as a Wildlife Corridor. - There will be no effect on the WFD status and objectives of Hebble Brook. Green Infrastructure enhancements - Key criteria for the public realm interventions is to 'improve green infrastructure and create a sustainable environment', in turn, supporting biodiversity. Permanent engineered enhancements include rain gardens at Winding Road and the Eastern Gateway (E05/06F). The green space will reduce the overall hardstanding area and provide the possibility of some infiltration/ small amounts of attenuation⁸. These rain gardens will comprise ornamental planting (as described above) with a change in planting medium to ensure it drains quickly and doesn't hold water.
Site Management for biodiversity	Unknown	Loss of close mown amenity grassland will be replaced with ornamental planting of benefit to wildlife and species rich grassland adjacent to Berry Lane and Cripplegate*, requiring less site management. Tree species have also been selected to minimise long term management/ maintenance, minimising disturbance to wildlife**.

Agreed with Calderdale Council Countryside Services as an appropriate species to promote biodiversity net gain within the Proposed Development Site

**Selection of plant species and considerations for on site management/ maintenance have been undertaken in consultation with Richard Robertshaw, Tree Officer (Calderdale Council) at a meeting held on 23/10/19.

Review of Local Biodiversity Action Plan Targets

The Calderdale Biodiversity Action Plan is for the period 2003-2010. However, the information provided in this plan is still applicable. Action plans have been prepared for habitats and species. Regarding habitats, the plans of relevance to the Proposed Development are rivers and streams, native woodland and urban habitats. A total of 244 Calderdale Priority Species have been identified; with a number of these being addressed within the Habitat Action Plans as well as within a generic Priority Species Action Plan. Specific plans have been developed for three species, none of which are of relevance to the Proposed Development. Table 3 provides a summary of Local Biodiversity Action Plan Targets relevant to the Proposed Development.

Table 3: Summary of Local Biodiversity Action Plan Targets Relevant to the Proposed Scheme

Relevant Local Biodiversity Action Plan Habitats	LBAP Habitat	LBAP Habitat Target Relevant to the Proposed Development	Notes
Broadleaved woodland	Native woodland	Ensure all native wildlife sites are maintained in an ecologically favourable condition.	All broadleaved woodland is to be retained.
Running water	Rivers and Streams	Maintaining water quality at existing and, and where possible improved levels.	There will be no effect on the WFD status and objectives of Hebble Brook.

⁸ AECOM (2020) Water Chapter 9 A629 Phase 2 Halifax Town Centre Environmental Statement Vol 1.

Urban	Urban Habitats	Restore a further 10ha of brownfield sites to an earlier stage of succession. Ensure there is accessible natural greenspace**.	Natural succession regeneration will be allowed to take place where the area of scattered trees and scrub is temporarily lost for the construction compound at Cripplegate. The Public Realm Report (AECOM, 2020) Appendix A General Arrangements show the green space and green infrastructure proposed.
Hedgerows*	Hedgerows	Plant 10km of new species-rich hedgerow by 2010.	New native hedgerow to be planted; however not species rich.
Species Rich Grassland	-	-	Contributes to urban greenspace in accordance with https://www.calderdale.gov.uk/v2/sites/default/files/biodiversity-actionplan.pdf

*Hedgerows are a proposed habitat type within the landscape design.

**States in the LBAP to be less than 300m (or 5-minute walk) from all homes.

Conclusion

Based on the approach applied to this assessment, it can be concluded that there would be a net gain in the following habitat types associated with the Proposed Development:

- Street trees (+84No.)
- Ornamental planting (+<0.1ha)
- Hedgerows (+105m)
- Species Rich Grassland (+0.15ha)

These include a number of native species (29No. of the 135No. tree specimens proposed). Given the urban nature of the Proposed Development and long-term site maintenance/ management considerations, where non-native species have been selected these will provide attractive colourful nectar-pollen rich flowers of benefit to wildlife (including pollinating insect species, and bird species) as well as providing aesthetic benefits to the local population and townscape setting.

There is a net loss of the following habitats:

- Scattered trees and scrub at Cripplegate (0.08ha)
- Running water – Hebble Brook open channel (4.5m)

This permanent loss of habitat is not considered to be significant in ecological impact assessment terms. The majority of the scattered trees and scrub will be retained (84%) maintaining the overall functional integrity of this habitat type. The Hebble Brook watercourse at this location has no aquatic vegetation and limited biodiversity value; and will still function as part of the 'Calderdale Wildlife Habitat Network' post development. Measures to protect the watercourse are included in a Framework Construction Environmental Management Plan (CEMP) accompanying the Application (ES **Appendix 4A**).

Natural succession regeneration will be allowed to take place where the area of scattered trees and scrub is temporarily lost for the construction compound at Cripplegate (0.22ha). This is likely to result in a mosaic of scrub and ephemeral perennial species establishing in the short to medium term (0-25 years).

Recommendations/Applicant Additional Commitments

It is recommended that alongside the planting of tree and ornamental species set out above, consideration should be given to other opportunities to provide urban greening within Halifax Town Centre. This could include:

- Installation of bat and bird boxes in suitable habitat/ where appropriate, which has already been committed to by the Applicant, comprising:
 - o integral bat roost features within the Hebble Brook Bridge replacement wall (as per indicative locations shown on **Figure 10.2 (Rev 3): Bat Survey and Ecological Mitigation and Enhancement Areas – Appendix B**);
 - o bird box for dippers and wagtails on the Hebble Brook Bridge (as per indicative location shown on **Figure 10.2 (Rev 3): Bat Survey and Ecological Mitigation and Enhancement Areas – Appendix B**);
 - o bat and bird boxes on mature trees or buildings to be retained adjoining the development site along Eastern Corridor (as per indicative locations shown on **Figure 10.2 (Rev 3): Bat Survey and Ecological Mitigation and Enhancement Areas – Appendix B**).
- Opportunities to improve in-channel habitats and the quality of high-way run-off discharging to Hebble Brook – reference is made to **Appendix 9B: Water Framework Directive Assessment** and **Appendix 9C: Drainage Strategy Report**.
- Planters containing native wildflower and ornamental species of value to pollinating insects.

Appendix A – Planting Information

TREES TO BE REMOVED

Area	Street	Ref	Species	Native No.	* Non Native No.
EASTERN SECTION	Charlestown Road	T1	Malus sp.	1	
		T2	Corylus colurna		1
		G3	Prunus sp.	2	
		G5	Malus sp.	1	
		T12	Salix sp.	1	
	Cripplegate	T13	Prunus sp.	1	
		G31	Acer Platanoides		1
	Eastern Gateway		Betula sp.	1	
			Tilia sp.	1	
			Carpinus betulus	1	
CENTRAL SECTION	Horton Street	T43	Acer sp.	1	
		T44	Acer sp.	1	
		T45	Acer sp.	1	
		T46	Acer sp.	1	
		T47	Acer sp.	1	
		T48	Acer sp.	1	
		T49	Acer sp.	1	
		G88	Acer platanoides		3
	Winding Road		Prunus sp.	5	
			Acer pseudoplatanus		2
		G89	Robinia pseudocacia		1
			Prunus sp.	1	
			Sorbus sp.	1	
			Sambucus nigra	1	
WESTERN SECTION	Market Street				
	Wards End	T52	Betula sp.	1	
		T53	Betula sp.	1	
		T54	Betula sp.	1	
	Skircoat Road	T63	Alnus sp.	1	
		T64	Alnus sp.	1	
	Northgate	T95	Tilia sp.	1	
		T96	Tilia sp.	1	
	Broad Street	G103	Prunus sp.	6	
			Sorbus sp.	1	
			Acer platanoides		2
			Carpinus betulus	1	
			Betula sp.	1	
	Bull Green	T107	Prunus sp.	1	

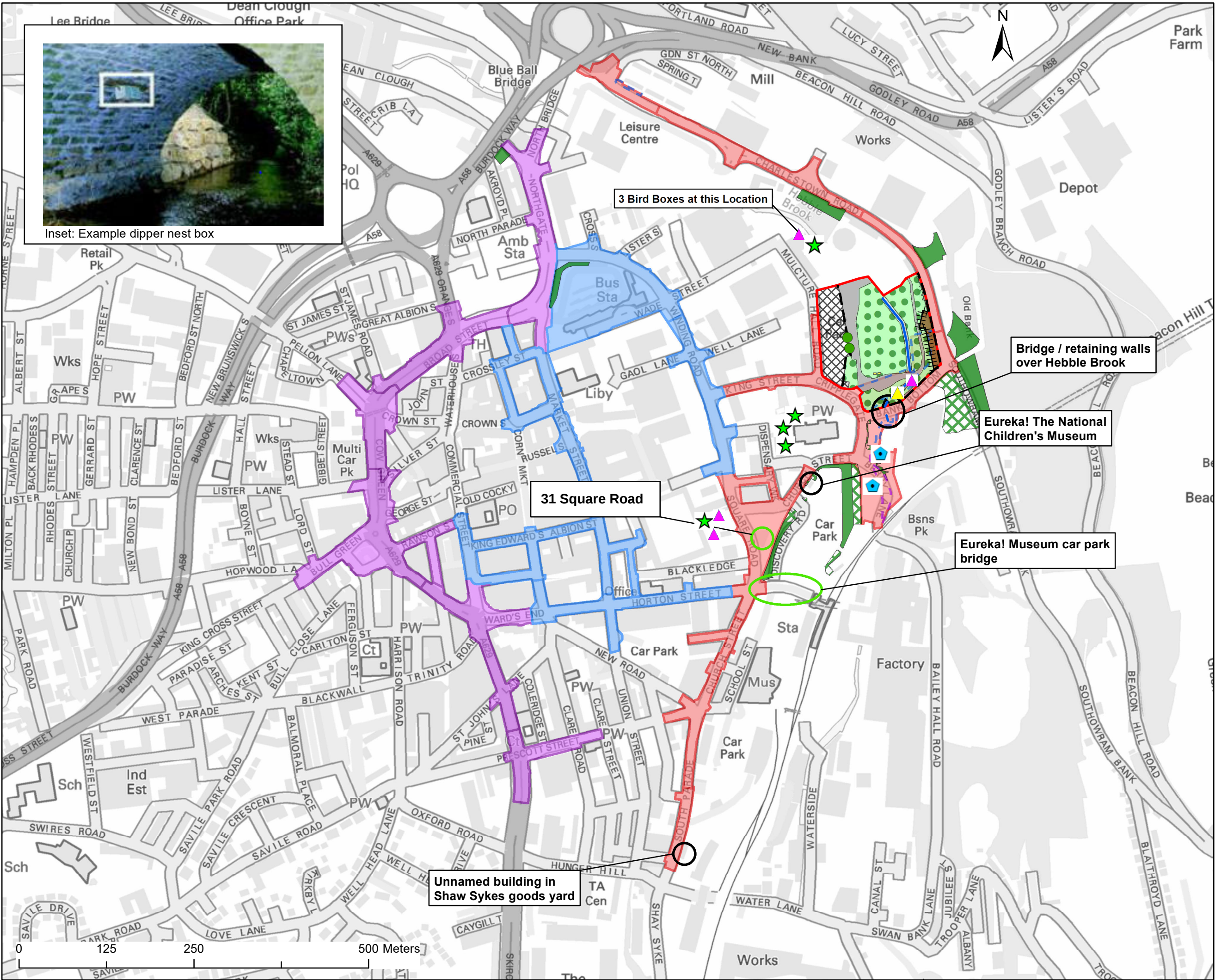
* It is unlikely that all cherry trees (Prunus sp.) are native

Sub-Total - Trees to be removed:	41	10
Total - Trees to be removed	51	

PROPOSED PLANTING

Area	Street	No.	Tree Species	Ornamental Planting / m2	Hedgerow / m	Species Rich Grassland
EASTERN SECTION	Cripplegate	0				1,532
		4	Amelancier Lamarkii	295		
	Eastern Gateway	8	Betula pendula "Fastigiata"			
		3	Betula pendula "Purpurea"			
		4	Prunus amanagowa			
		6	Liquidamber styraciflua			
		3	Liriodendron tulipifera "Fastigiatum"			
		28		295		1,532 Sub total
CENTRAL SECTION	Horton Street	1	Liquidamber styraciflua	340		
		4	Prunus amanagowa			
	Winding Road	5	Betula pendula "Fastigiata"			
		3	Prunus "Amanagowa"			
		3	Sorbus aucuparia "Cardinal Royal"		87	
	Market Street	0	Betula pendula "Fastigiata"			
		10	Liquidamber styraciflua			
		5	Liriodendron tulipifera			
		1	Prunus amanagowa			
		3	Prunus "Sunset Boulevard"			
		6	Quercus robur "Fastigiata"			
		41		340	87	Sub total
WESTERN SECTION	Wards End	5	Liquidamber styraciflua			
		3	Prunus Sunset Boulevard			
	Skircoat Road	0				
	Northgate	3	Betula pendula "Fastigiata"			
		3	Liriodendron tulipifera			
		3	Prunus "Amanagowa"			
	Broad Street	6	Liriodendron tulipifera "Fastigiatum"	93		
		3	Prunus Sunset Boulevard			
	Bull Green	4	Betula pendula "Fastigiata"	30		
		4	Liquidamber styraciflua			
		3	Prunus amanagowa			
		3	Prunus Sunset Boulevard			
	Cow Green	8	Quercus robur fastigiata	165		
		7	Prunus Sunset Boulevard			
	Commercial Street	8	Liquidambar straciflua			
		2	Prunus Sunset Boulevard			
		1	Liquidamber styraciflua			
		66		288	18	Sub total
135				923	105	1532 Total

Appendix B – Figure 10.2 (Rev 3) Bat Survey and Ecological Mitigation and Enhancement Areas



Inset: Example dipper nest box

AECOM

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Project Title:

A629 – PHASE 2
HALIFAX TOWN CENTRE
IMPROVEMENTS

Client:

CALDERDALE COUNCIL

- ★ Indicative/Potential Bat Box Location
- ▲ Indicative Bird Box Location
- ▲ Indicative Features in Hebble Brook Bridge Replacement Wall - Bats
- ⬢ Land for Habitat Enhancement

LEGEND

- Central Area
- Eastern Corridor
- Western Corridor
- Temporary Land Take
- Land Give
- Cripplegate Boundary
- Broadleaved Woodland
- Dense Scrub
- Gravel / Stone
- Hard Standing
- No
- Portakabin
- Scattered Trees & Scrub
- Fence
- Running Water
- Brick Wall
- Mature Tree
- Confirmed Roost Sites
- Bat Survey Area

Copyright:

Source: © Crown copyright and
database rights 2017
Ordnance Survey 0100031673
Projection: British National Grid

AECOM Internal Project No:

60528270

Drawing Title:

BAT SURVEY AREAS AND
LOCATION OF CONFIRMED
ROOSTS

Scale at A3: 1:5,000

Drawing No:

FIGURE 10.2

Drawn: Chk'd: App'd: Date:

DM LK LK 14/05/20