

# 6. STREET DESIGN PRINCIPLES

## 6a. TYPICAL STREET & JUNCTION DESIGN

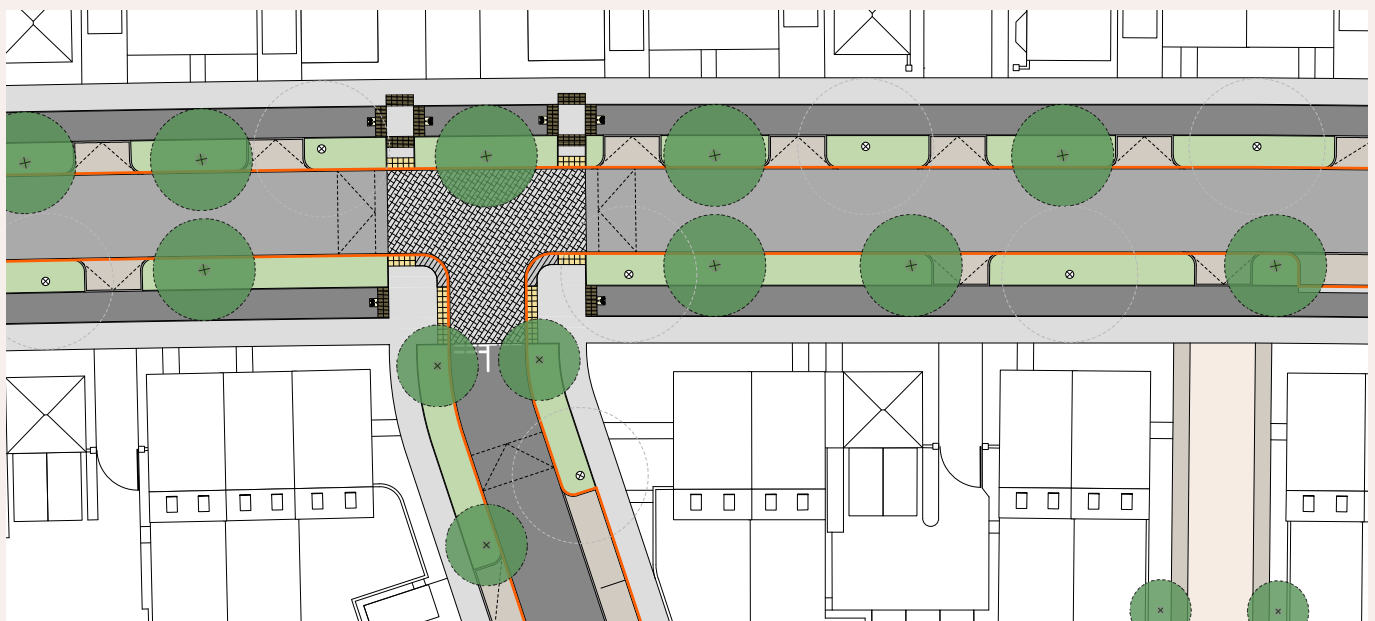
This section considers how the streets will look and feel for people moving around Welborne. The design of the streets will be influenced by several overarching design principles alongside technical requirements.

### KEY COMPONENTS *(Must be adhered to)*

- 2.5m wide verges shall be incorporated on all Primary, Secondary, Tertiary and Edge Lane 1 and 2 street types.
- 3m cycleways on both sides of the street will be incorporated on Welborne Way
- 2m one way cycleways on both sides of the street will be incorporated on primary streets.
- A 3m two way cycleway will be incorporated on one side of a secondary street.
- Junctions on primary and secondary streets will be designed to give priority to pedestrians and cyclists.

- Where raised surface junctions are utilised the vehicular approach to these will be a 1.37 gradient over 3 kerb lengths.
- Raised surfaces that are to be adopted will use a resin bonded surface finish on primary roads and bus routes, block paving is acceptable elsewhere.
- Driveway crossovers and in verge parking spaces will be surfaced in permeable block paving and use a 1m radius quadrant kerb detail
- Street trees will be incorporated in all verges, with street lighting columns located at least 5m from the trunk of trees.
- The design detail of verges will discourage parking on the verge by providing a 100mm kerb, the introduction of planting and trees and where required bollards.

### Primary Street incorporating a raised surface junction



#### KEY

- |   |  |                                 |
|---|--|---------------------------------|
| Footway (Paving Slabs)  | Street lamp (min. 5m offset to tree trunk)             | Granite Sett Grip               |
| Carriageway (Tarmac)  | Trees  | Catchpit/Gully                  |
| Cycleway (Tarmac)   | Parking & Driveway Crossovers (Permeable block paving) | Bioretention System             |
| Tree verge  | Crossroad Junction Surface (Resin bounded gravel)      | Dropped flush kerb for drainage |
| Concrete Kerbs (100mm high)<br>Conservation kerbs in special places | Cycleway Tactile Paving                                | Adoption Boundary               |
| Tactile Paving  | Integrated Cycleway Symbol                             |                                 |

## 6b. STREET TREES

At the heart of the vision for Welborne is to create streets lined with trees and hedges. The streets will be designed to accommodate trees with mature canopy spread supported by management of the trees by WGVT over their lifetime.

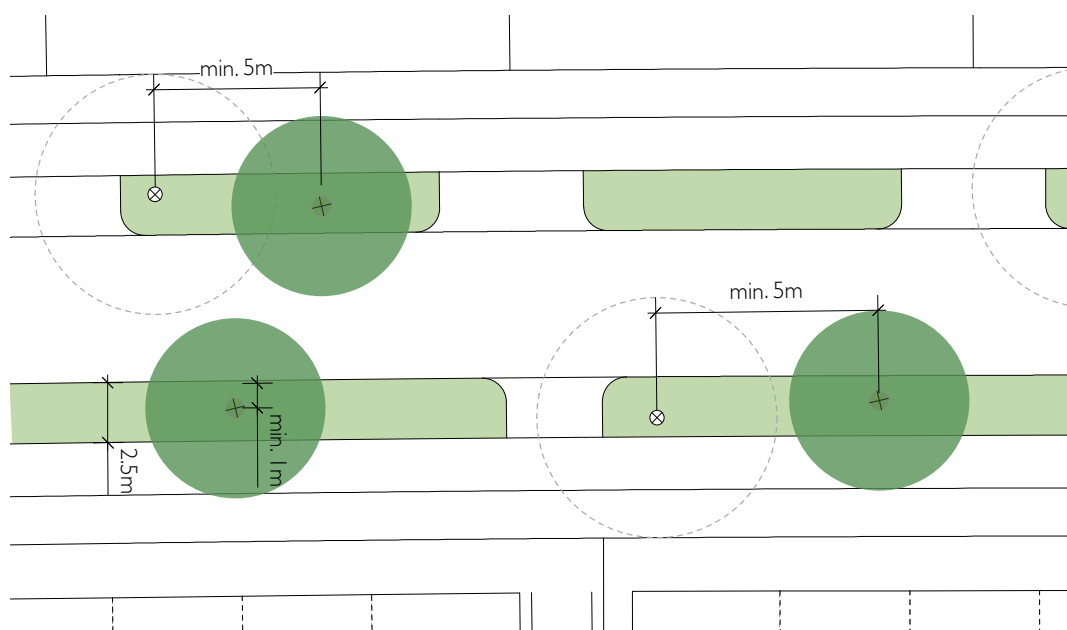
Siting of street trees from the public highway will depend on visibility splays, driveway cross overs and street light column spacing. Also to be considered in the detailed design shall be the chosen tree species, required soil volumes for the tree and provision of root protection barriers. Soil volume for street trees will include trenching under verge driveway crossovers and verge visitor parking bars.



Streets designed to incorporate verges, trees and hedges to property boundaries

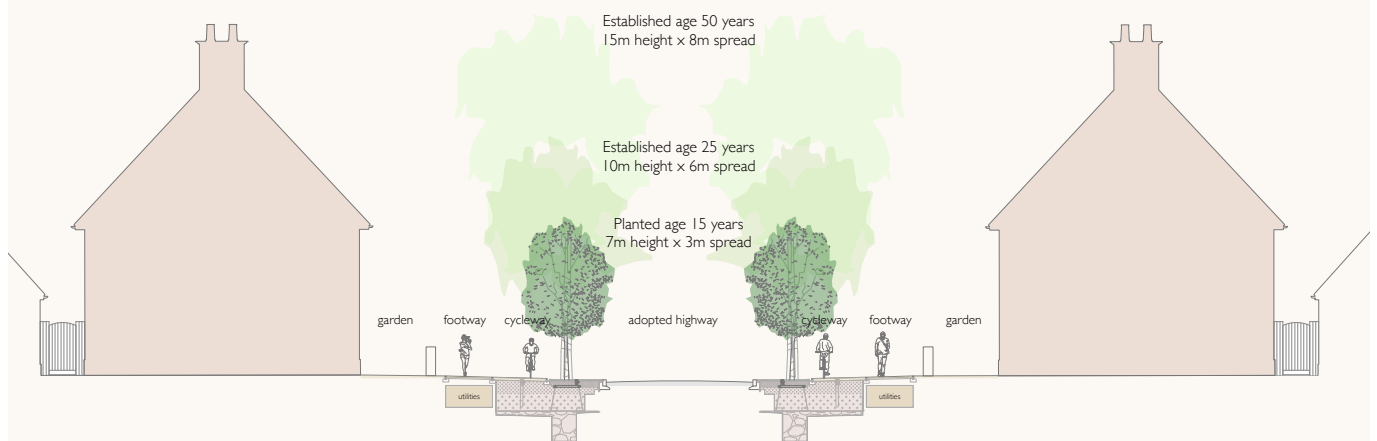
### KEY COMPONENTS *(Must be adhered to)*

- Verge widths on streets with trees will typically be 2.5m.
- Street trees will be centred a minimum of 1m from the edge of the carriageway. Dimension taken from the centre of the tree trunk.
- On occasion trees may be sited within junction visibility splays to achieve the Welborne design vision of tree lined streets. *Due to the low design speeds throughout the development, isolated obstructions should not pose an unacceptable safety risk. The principle is supported by Manual for Streets, which states 'occasional obstacles to visibility that are not large enough to fully obscure a whole vehicle or a pedestrian, including a child or wheelchair user, will not have a significant impact on road safety' (DfT, 2007, p. 94).* Trees may also be sited in visibility splays for front driveway access.
- Street lighting columns will be located at least 5m from the trunk of trees.
- There will be a 1m minimum gap between garden trees and the highway's adopted edge.



The following typical sections demonstrate how street trees (with the required soil volume) and drainage will be incorporated on a primary, secondary and tertiary street..

### Primary Street cross-section








#### Primary Street Trees

Where verges extend alongside cycleways

Large Tree Species provided with 36m<sup>3</sup> rooting volume of Stockholm System (equivalent to 28m<sup>3</sup> open soft ground)

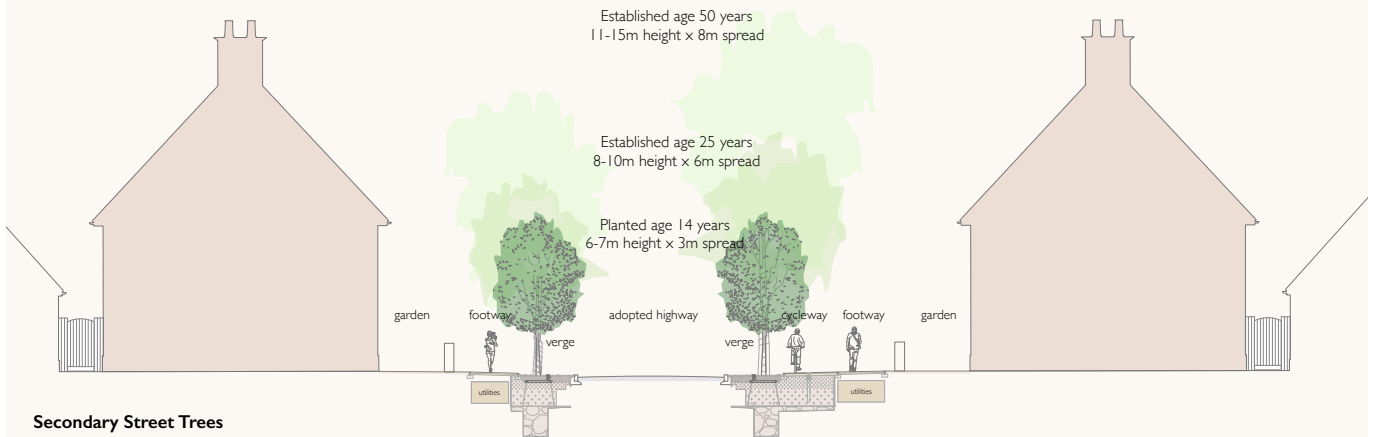
Supply size 35 - 45cm girth  
4x transplanted (circa 15 years age)  
*Tilia cordata* 'Greenspire'

-  Root volume
-  Utilities
-  Adopted highway
-  Cycleway / Footway
-  Verge

Illustrative image of a Primary Street



## Secondary Street cross-section



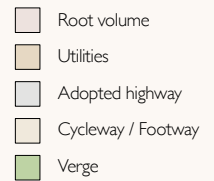
### Secondary Street Trees

Where verges extend alongside footways & cycleways

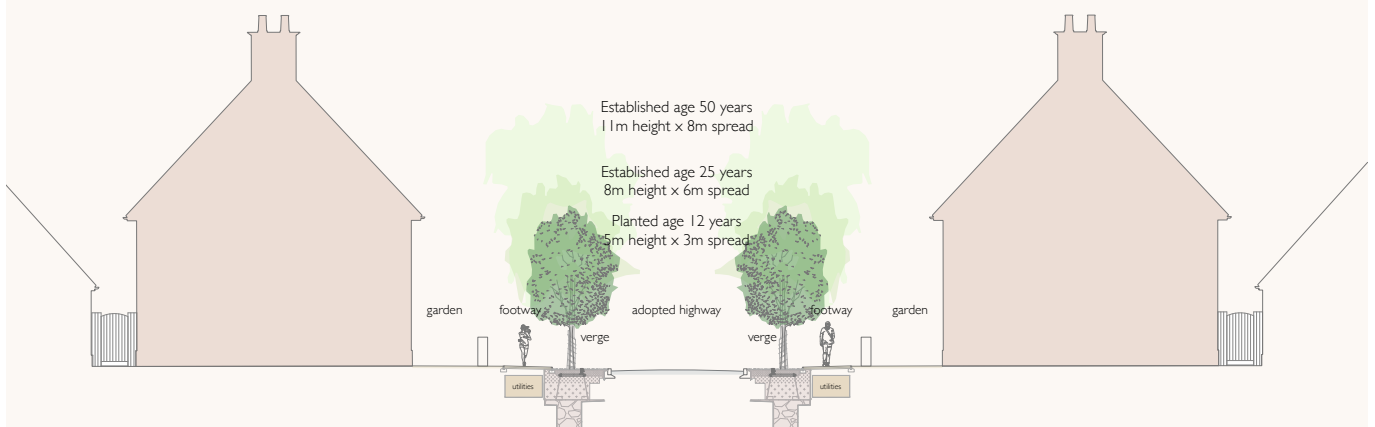
Large Tree Species provided with 36m<sup>3</sup> rooting volume of Stockholm System (equivalent to 28m<sup>3</sup> open soft ground)  
Medium Tree Species provided with 26m<sup>3</sup> rooting volume of Stockholm System (equivalent to 20m<sup>3</sup> open soft ground)

Supply size 30 - 40cm girth  
4x transplanted (circa 14 years age)

Carpinus betulus (Large), Ulmus 'New Horizon' (Medium)



## Tertiary Street cross-section



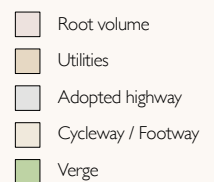
### Tertiary Street Trees

Where verges extend alongside footways

Medium Tree Species provided with 26m<sup>3</sup> rooting volume of Stockholm System (equivalent to 20m<sup>3</sup> open soft ground)

Supply size 20 - 25cm girth  
4x transplanted (circa 12 years age)

Acer campestre



# 6c. STREET LIGHTING

At Welborne, street trees are integral to the proposed landscape structure of the plan and so the coordination of lighting columns and trees is a vital aspect of the design.

The lighting must achieve the technical and performance requirements of HCC and be successfully integrated into the proposed tree-lined streets across Welborne.

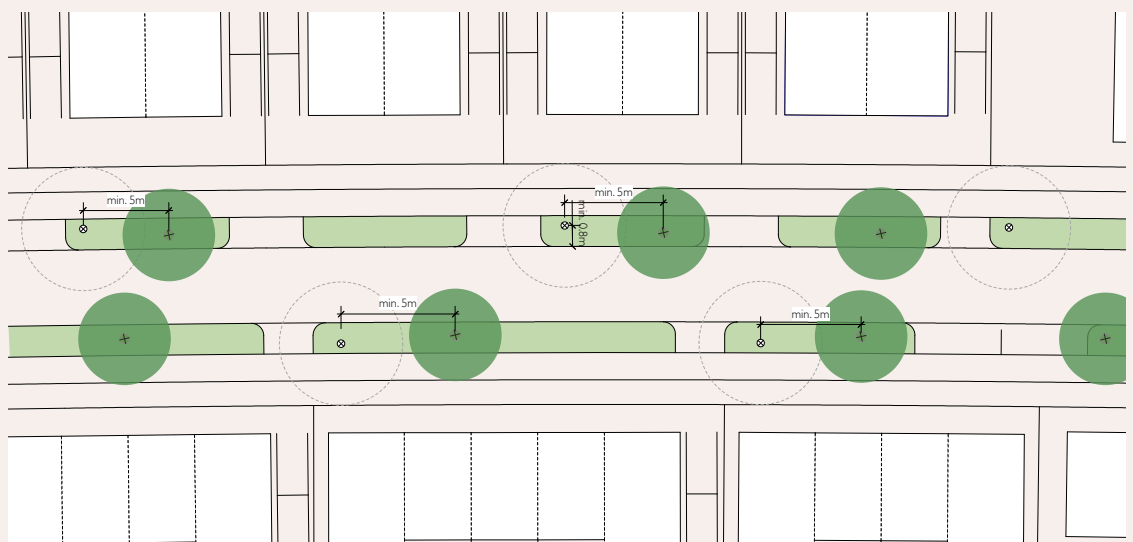


Typical HCC street light

### KEY COMPONENTS *(Must be adhered to)*

- Street lighting columns will be located at least 5m from the trunk of trees.
- Street lighting columns to be a minimum of 0.8m set back from the carriageway.
- All street lighting columns will be HCC standard BS48 #12B21 green column except for key areas where there may be black to match street furniture (example Village Centre and District Centre)
- The lighting columns proposed are to be 6m high on primary streets and 5m high on secondary, tertiary and edge lanes. For green links and shared routes, 4m columns or bollard lighting will be proposed.
- Wall mounted lighting on buildings is acceptable in limited instances providing an easement for access to undertake repairs is provided. All junction boxes must be located on the external façade of the building, not in cavities.
- Unadopted roads and footways do not have to be lit to adoptable standards.
- Cycleways and footpaths through open space will be unlit, with the exception of key routes determined on a case by case basis - the route from J10 to Kiln road across Fareham Common shall be lit.

Right: Illustrative plan showing placement of street lighting relative to street trees



# 6d. DRAINAGE

Surface water drainage is required to convey rainwater that falls onto roofs or hard paved areas away from habitable areas, and to ensure that flooding does not occur. At Welborne, the philosophy of surface water drainage is to achieve sustainable, environmentally enriching systems that closely mimic the process seen on a natural landscape. This will include swales within verges, bioretention and permeable paving to capture first flush pollution and minimise run-off from more frequent rainfall events.

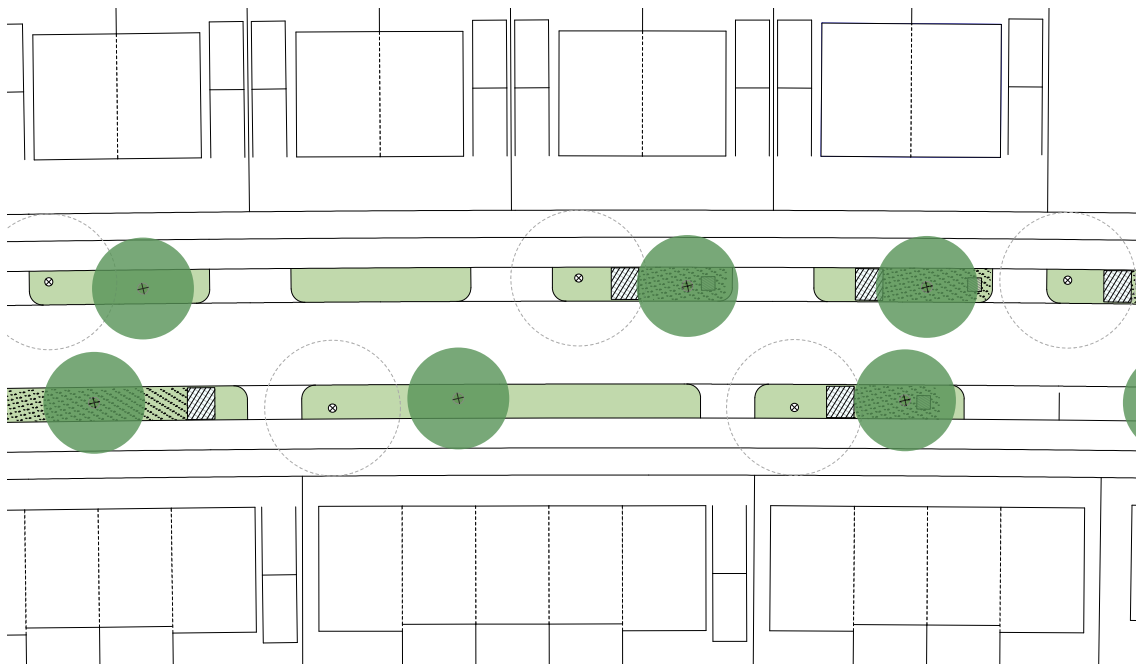


Example of a swale incorporated into a verge

### KEY COMPONENTS *(Must be adhered to)*

- Verges may be designed to incorporate surface water swales that will be managed by WGVT. These unadopted swales will accept highway drainage.
- Parking bays and driveway crossovers will use permeable paving.
- On primary and secondary roads, highway surface run off, will be managed by WGVT as soon as it leaves the extent of the highway.
- Any highway drainage apparatus, adopted by HCC required outside of the adopted highway, will require a maintenance easement.
- All unadopted lay-bys will fall away from the adopted highway.
- All streets and parking courts will incorporate 'interception storage' whereby the first 5mm of rainfall is captured close to source and disposed of via soakage or evaporation.

Right: Illustrative plan showing swales incorporated into verges on a typical street



## 6e. SIGNS & LINES

Signage and lining is to be kept to an absolute minimum at Welborne in order to create a high-quality public realm and great streets without visual clutter. In short, any sign or line will need to earn its place.

### KEY COMPONENTS *(Must be adhered to)*

- Only those signs or lines that are deemed absolutely necessary will be permitted. Some examples of lining that will be required include bus cages on Welborne Way, centre lines and give way markings on significant bends or junctions and safety lining associated with schools.
- If highway signs are required, then they should preferably be co-located on lighting columns or placed on buildings.
- To reduce clutter on footways, street naming signs should be placed on adjacent walls or buildings.
- The positioning of signage should not create an obstruction to pedestrian movement, entrance ways or street cleansing, and must not impede highways visibility splays.
- To ensure that the sustainable transport objectives are met, way-marking should be clear, logical and user friendly.
- Bespoke street signs and general town signage will be designed for Welborne in accordance with the design aspirations and intended vision. The design of this signage will be agreed with FBC and KCC.
- All Highway lines and signage will be compliant with Traffic Signs Regulations and General Directions 2016 & TGI2.



Signage and lines shall be kept to a minimum in the street scene at Welborne.



Bespoke street signs and general town signage will be created for Welborne.

# 6f. MATERIALS & STREET FURNITURE

The overarching principles for the public realm design are that design choices relating to materials and street furniture provide a coherence and legibility across Welborne. Welborne's strategy regarding materials and street furniture promotes simplicity and easy maintenance.

## HARD LANDSCAPING MATERIALS

The material palette for the streets within Welborne is divided into three main approaches: typical treatment, informal treatment and special places. This palette will create a varied sense of place where the different treatments are utilised aiding legibility.

Where shared space principles apply, extra consideration should be given to tactile hazard warning paving and contrasting colour palette to aid navigation for everyone and promote an inclusive design approach.

### Typical treatment (Hampshire adoptable standards)

- Typical primary, secondary, tertiary streets and courtyard lanes.
- A simple, robust and durable palette of materials for the majority of residential streets.

### Informal treatment

- Edge lanes, greenways and green links.
- Informal softer material specification to reflect natural edge and landscape locations.

### Special places

- Streets and spaces in relation to urban squares and areas within Welborne Park, neighbourhood parks and community green spaces.
- High-quality materials to highlight a change in the setting from typical residential streets to civic spaces.
- These areas may be considered for adoption and the materials chosen must be in accordance with HCC requirements. Where specified materials do not meet HCC requirements these areas shall be the responsibility of WGVT.
- Where shared space principles apply, extra consideration should be given to tactile hazard warning paving and contrasting colour palette to aid navigation for everyone and promote an inclusive design approach.



# TYPICAL TREATMENT

ROADS



Hot rolled asphalt



Resin bonded gravel

FOOTWAYS



Concrete paving slabs

CYCLEWAYS



Hot rolled asphalt



Integrated cycleway symbol

KERBS



Concrete



Kerb channel drain to swale system

CHANGE OF SURFACE



Concrete setts in contrasting colour (example use include transition strips)



Granite Setts in contrasting colour (example uses include drainage areas in verges and at and junctions)

PARKING & DRIVEWAYS



Permeable concrete setts



Gravel

Where gravel is used for a driveway it will be set back a minimum of 0.5m from the footway to prevent spilling onto highways. A paved or asphalt strip will be required to separate.

# INFORMAL TREATMENT

ROADS



Hot rolled asphalt

FOOTWAYS



Asphalt (above)  
Breedon gravel (below)  
Surfaced dressed gravel



Concrete paving slabs

CYCLEWAYS



Breedon gravel



Integrated cycleway symbol

KERBS



Concrete



Timber edge (above)  
Concrete 50mm kerb (below)



No edge

Gravel-path edging can be omitted and the grass or adjacent vegetation allowed to encroach on the edges of the path for a softer edge and to avoid edging becoming trip hazards for cyclists

CHANGE OF SURFACE



Concrete sets in contrasting colour  
(example use include transition strips)



Granite sets in contrasting colour  
(example uses include drainage areas in verges and at and junctions)

PARKING & DRIVEWAYS



Gravel

Where gravel is used for a driveway it will be set back a minimum of 0.5m from the footway to prevent spilling onto highways. A paved or asphalt strip will be required to separate.

# SPECIAL PLACES: STREETS

ROADS



Hot rolled asphalt with natural aggregate chippings

FOOTWAYS



Concrete block paving



Concrete setts

CYCLEWAYS



Hot rolled asphalt



Integrated cycleway symbol



Demarcation block

KERBS



Conservation kerb



Flush conservation kerb

CHANGE OF SURFACE



Concrete setts in contrasting colour  
(example use include transition strips)



Granite setts in contrasting colour  
(example uses include drainage areas in verges and at junctions)

PARKING



Permeable concrete setts in various colour tones

# STREET FURNITURE

As per the material palette, the street furniture selection should be specified to enhance the character of the open space around it as a complement to the surrounding architecture and functionality of the place.

A site-wide strategy of products and styles should be used throughout the development to establish a clear family range and ensure a safely navigable public realm.

A standard Hampshire street furniture palette should be used in relation to the streetscape where products must comply to the adoptable standards set out by the Local Authority and respond to Highways requirements.

Welborne's street furniture strategy is divided into three main approaches: Typical Treatment; Informal Treatment; and Special Places.

TYPICAL TREATMENT



- Palette to convey a timeless and tranquil feel with particular attention to robust and hard wearing materials
- Material example: metalwork stainless steel/galvanised steel

INFORMAL TREATMENT



- Natural and semi-natural, softer feel with particular focus on local handmade crafts and arts
- Material example: timber, stone

SPECIAL PLACES



- High-quality street furniture characterised by a robust, natural style and sustainable use of materials that convey the identity of the place
- Material example: FSC hardwood, natural stone, high-quality concrete, metalwork stainless steel/galvanised steel



## 6g. SLOW-SPEED STREETS

The street network at Welborne will be designed to achieve slow speed streets through the implementation of regular traffic calming measures to reduce traffic speeds and improve quality of place.

Secondary and tertiary streets across Welborne Garden Village will have a maximum design speed of 20mph (32 kph), though, in accordance with para 8.2.13 of Manual for Streets 2 (MFS2), this will be achieved through design rather than a signposted 20mph zone. Following Hampshire County Council TG3 para 3.1.2 visibility splays and minimum stopping sight distance will be based on the 20mph design speed.

To achieve speeds of 20mph, or less, traffic calming features shall be spaced no more than 70m apart (DfT1, 2007, p. 88). Straight uninterrupted links should therefore not exceed 70m in length.

There are various features which can be used to break up a continuous link and slow traffic. Different traffic calming features work in different ways and with varying degrees of effectiveness.

Traffic calming measures proposed for use across tertiary and secondary streets within Welborne are:

### KEY COMPONENTS *(Must be adhered to)*

- Horizontal alignment – bends with less generous radii (CIHT, 2010, p. 52), chicanes, etc.
- Changes in priority
- Carriageway narrowing using changes in material
- Reduced visibility
- Raised junctions using changes in material
- On-street parking, including chevron and perpendicular bays
- Central islands using changes in material

Psychology and perception are important factors in achieving the desired design speed and establishing a sense of place, although they are not permanent traffic calming features. The presence of pedestrians, cyclists and active frontages can have a strong influence on reducing the speed at which people choose to drive (DfT1, 2007, p. 88).

### References

CIHT, 2010. *Manual for Streets 2*, London: CIHT.  
DfT1, 2007. *Manual for Streets*, London: Thomas Telford.  
DfT2, 2007. *LTN 01/07 Traffic Calming*, London: TSO.

### I. Horizontal Alignment

Manual for Streets (MFS) and Manual for Streets 2 (MFS2) recognise that the minimum bend radii required in CD109 are not suitable for designing high-quality streets. For streets with a design speed of 60kph and less, MFS2 recommends implementing horizontal curves with radii four steps below the desirable minimum from CD109, having a  $v^2/R$  value equal to 56.

These tighter curve radii can be implemented as traffic calming features (CIHT, 2010, p.52) and will naturally create slower speed streets than the design speed.

Table 1 below shows these minimum acceptable carriageway centreline radii for design speeds of 10, 20 and 30mph. For example, on a 20mph road- a  $V^2/R$  value of 56 (which is 4 steps below the minimum in CD109; the recommended value for slower speed streets in MFS2), the minimum radius is 18.3m



**Table 1:**  
Percentage speed reduction at bends (CIHT, 2010, p. 52)

Design Speed, V	mph	10	20	30
	kph	16	32	48
MfS2 recommended 4 steps below min. in CD 109, $V^2/R$		56	56	56
MfS2 recommended radii (using $V^2/R$ )	R (m)	4.6	18.3	41.1



Use of horizontal curve as a traffic calming feature

## 2. Changes in Priority

Changes in priority at junctions and no defined priority at squares can be introduced as a traffic calming feature to interrupt otherwise continuous links.

Where possible, squares (with no defined priority) should be used in preference to raised junctions.



Square used to introduce change in priority

## 3. Carriageway Narrowing

Carriageway narrowing can have a significant influence on speeds (DfT1, 2007, p. 88). See Figure 1. Carriageway narrowing at Welborne will be functional and have a purpose such as crossing points. Change of material surfacing will be used to highlight crossing points. Block paving is proposed for non-primary roads and bus routes.

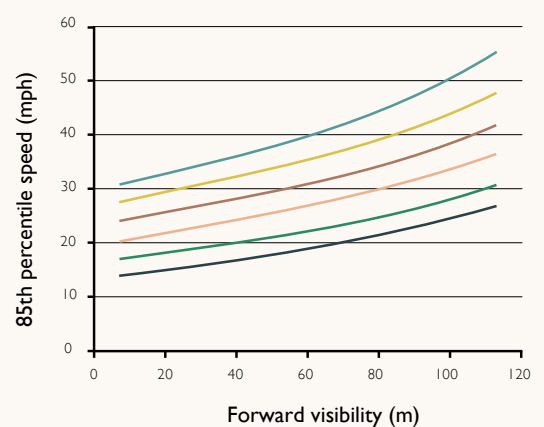
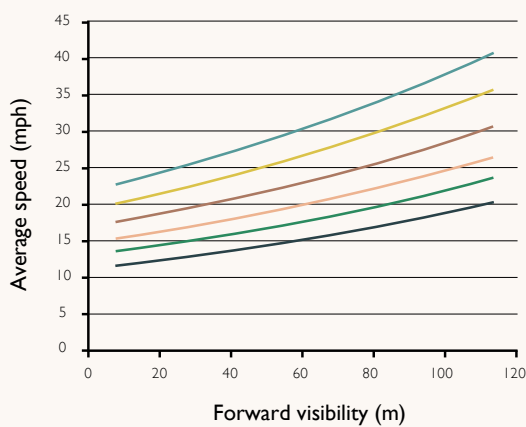
Narrowed sections shall be a minimum width of 3.7m (1.85m lanes) on tertiary streets and shall be 5m (2.5m lanes) on secondary streets.



Carriageway narrowing to reduce traffic speeds

### Figure 1:

Correlation between visibility, carriageway width and vehicle speeds (DfT1, 2007, p. 89)



- Road width = 10 m
- Road width = 9 m
- Road width = 8 m
- Road width = 7 m
- Road width = 6 m
- Road width = 5 m



#### 4. Reduced Forward Visibility

As a traffic calming feature, MFS2 permits minimum forward visibility to be restricted below the minimum stopping sight distance (SSD) (CIHT, 2010, p. 75). The minimum SSD for 20mph and 30mph design speeds are 25m and 43m, respectively. Where used in Welborne, restricted visibility should be introduced naturally into the masterplan.



Road alignment with reduced forward visibility that will promote slower vehicle speeds



Houses create reduced forward visibility and speed reduction bend

#### 5. Raised Junctions

Raised junctions can be used on cross-roads and T-junctions to provide traffic calming features, but also to highlight and improve the safety of pedestrian crossings. Raised junctions provide very effective reductions in traffic speeds and accidents and injuries, they cause little delay to emergency services and are well perceived by the public (DfT2, 2007, p. 9).

At Welborne raised junctions will be designed with an approach gradient of 1:35 over 3 standard kerb lengths (2745mm). The surface material of ramps and the raised table will be resin bound gravel.



Raised junction at a cross-roads that shall act as a traffic calming feature

## 6. On-Street Parking

Perpendicular or echelon formation on-street parking can provide effective traffic calming through the introduction of side friction (DfT I, 2007, p. 88). However, longitudinal parking has a reduced traffic-calming impact.

Perpendicular or echelon parking should be provided in discreet groups, with regular gaps, to maintain good access and visibility for pedestrians.



Perpendicular parking at a proposed public space that will function as a traffic calming feature



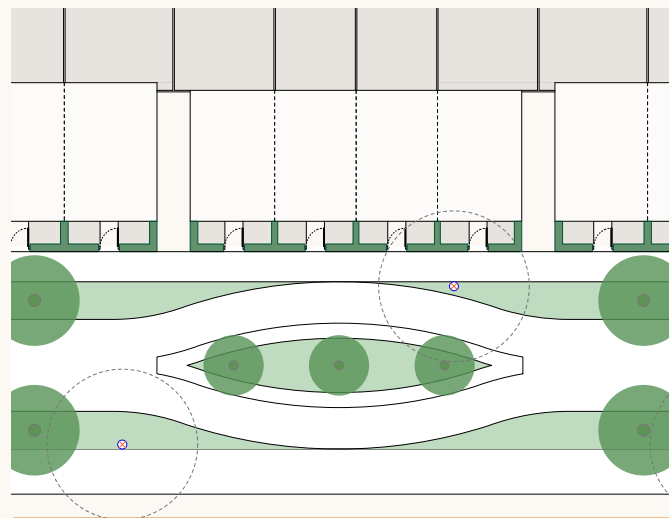
On-street parking to introduce side friction

## 7. Central Island

Central islands can be provided as traffic calming features on continuous links, and can also provide space for trees and landscaping.

Central islands will be 3m wide with 1m overrun areas on each side (total width 5m), and have 2.75m through lanes. Islands can be developed symmetrically or asymmetrically from the centre line with 1 in 5 tapers.

Any design will need to be tracked for buses and refuse vehicles. Central landscape areas if not adopted by HCC will be the responsibility of WGVT.



Central island feature with tree planting

# 6h. VISIBILITY

Secondary and tertiary streets across Welborne will have a maximum design speed of 20mph (32 kph). However, the design speed will be dynamic along each street. Reduced forward visibility and tight corner radii will be incorporated into the development to reduce design speed in distinct areas.

A central component of Welborne's ethos will be the presence of a large number of trees throughout the site. Visibility splays, on occasion, will be obstructed by trees; however, this is unavoidable given the nature of the development. Due to the low design speeds throughout the development, isolated obstructions should not pose an unacceptable safety risk. The principle is supported

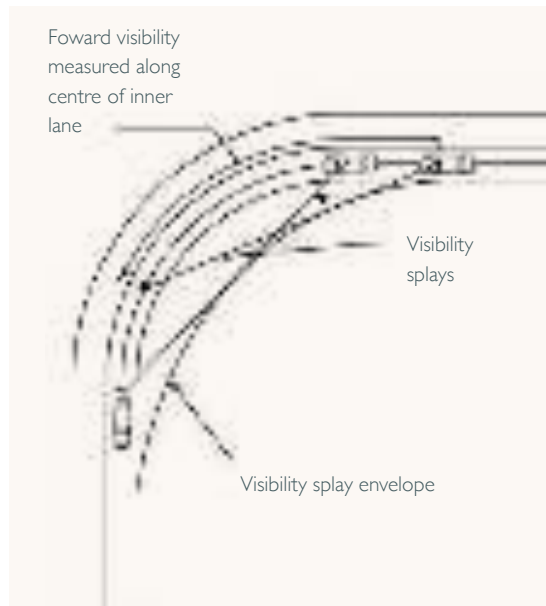
by Manual for Streets, which states 'occasional obstacles to visibility that are not large enough to fully obscure a whole vehicle or a pedestrian, including a child or wheelchair user, will not have a significant impact on road safety' (DfT I, 2007, p. 94).

### KEY COMPONENTS *(Must be adhered to)*

This section addresses the visibility principles to be adopted across Welborne in relation to:

1. Forward visibility, horizontal and vertical
2. Junction visibility splays
3. Cycle and pedestrian visibility
4. Frontage access visibility splays

**Figure 2:**  
Measurement of forward visibility (DfT I, 2007, p. 94)



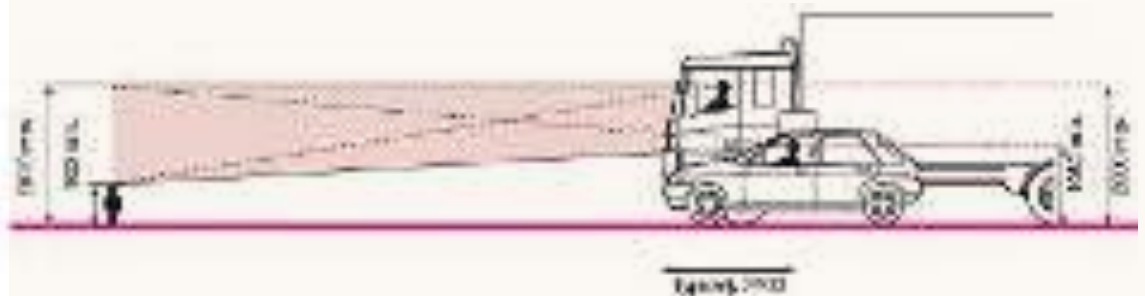
### 1. Forward Visibility

Forward visibility is the distance a driver needs to see ahead to stop safely for obstructions in the road. The minimum forward visibility is equal to the minimum SSD as required by the design speed, see **Table 2**. It is checked by measuring between points on a curve along the centreline of the inner traffic lane (DfT I, 2007, p. 94). See **Figure 2**.

Reduced visibility can be used as a traffic calming feature, as outlined in below and shown in 5.f 4.

Where tight curve radii or other traffic calming features are used to reduce the local design speed, the minimum SSD can be reduced accordingly. For example, a curve radii of 13m within a 20 mph zone would reduce the required SSD to 18m, a 5m radii curve in a 10 mph zone would reduce the required SSD to 9m, see **Table 1**.

**Figure 3:**  
Vertical visibility envelope



**Table 2:**

SSD to be adopted across Welborne

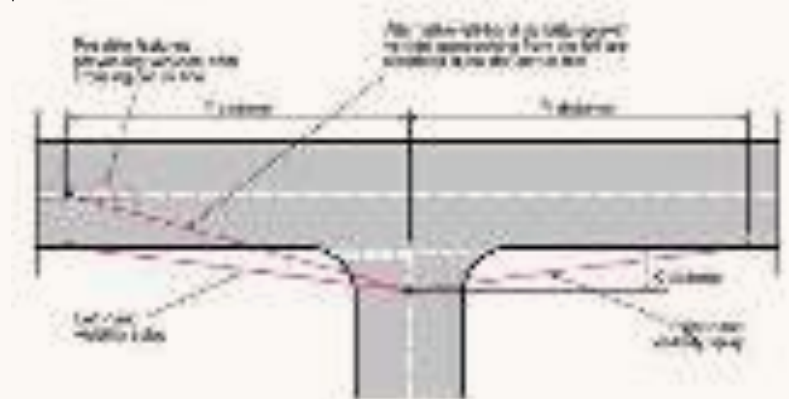
Design Speed (Kph/mph)	SSD (m)
16 / 10	11
32 / 20	25
48 / 30	43

Visibility should not be obstructed by vertical obstructions within an envelope 0.6m above the carriageway level to 2m above carriageway level, see **Figure 3**. Boundary treatments adjacent to the carriageway shall be designed accordingly.

**2. Junction Visibility**

Junction visibility splays ensure there is adequate inter-visibility between vehicles. See **Figure 4**. Within Welborne an X distance of 2.4m shall be used, and the Y distance shall be equal to the minimum SSD as per **Table 2**.

Due to the nature of Welborne, there may be instances where trees fall within junction visibility splays (see above. DfT 1, 2007, p. 94).



**Figure 4:**

Junction visibility splay

**3. Cycle, pedestrian and equestrian visibility splays**

Welborne will promote active travel across the site and the required infrastructure shall be designed into the masterplan. Where non-motorised user (NMU) routes meet the carriageway, visibility splays shall be provided to improve the safety of non-motorised users.

Visibility splays shall be designed according to **Figure 4**, with the X distance measured from the carriageway kerb/channel line. Y distances shall be set according to the carriageway design speed and comply with **Table 2**.

X distances across the development shall be;

- Pedestrians – 1.5m
- Cycles – 2.5m
- Equestrians – 3m

**Figure 5:**

Typical Welborne frontage access

**4. Frontage access and visibility**

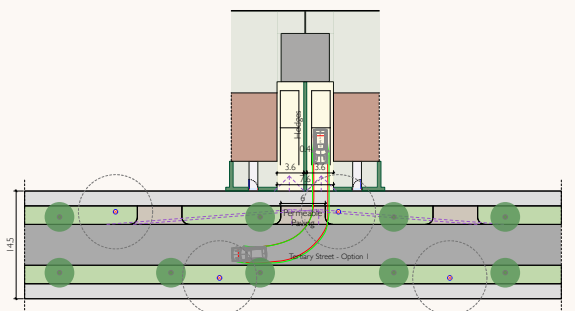
Frontage accesses at Welborne will usually cross a footway and/or cycleway route before reaching the carriageway. See **Figure 5**.

carriageway kerb/channel line, Y distances shall be set in accordance with the design speed.

See **Figure 5**.

A 2m x 2m inter-visibility zone 0.6m above carriageway level shall be provided from the rear of the footpath/shared space to ensure drivers exiting driveways have good visibility of approaching pedestrians or cyclists, see **Figure 5**.

Visibility splays shall be provided per **Figure 4** with an X distance of 2m measured from the



**References**

CIHT, 2010. *Manual for Streets 2*, London: CIHT.  
 DfT 1, 2007. *Manual for Streets*, London: Thomas Telford.  
 DfT 2, 2007. *LTN 01/07 Traffic Calming*, London: TSO.

# 6i. PARKING & CYCLE PARKING STRATEGY

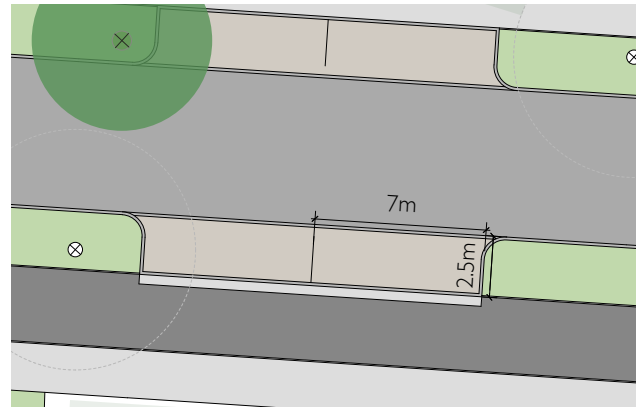
## PARKING AND CYCLE STANDARDS

The residential and commercial parking and cycle parking strategy is set out in the Welborne Strategic Design Code and will conform with FBC Parking Standards and key requirements as set out in Welborne Design Guidance by FBC.

Visitor parking will be provided within verges on all street types, in courtyard lanes and parking courts and public parking areas.

### KEY COMPONENTS *(Must be adhered to)*

- Standard parking spaces will be 5m x 2.5m (4.8m x 2.4m is considered unacceptable at Welborne)
- Perpendicular parking spaces will be 2.5m x 6m, where provided in a verge the spaces on the end of runs will be 2.5m x 7m to enable a 90-degree kerb return.
- Communal EV charge points will be provided in the Village Centre, District Centre and other commercial and public parking areas. These will be located in grouped spaces with a charging hub. There will be no EV charging points on typical streets.
- Cycle parking will be provided in accordance with FBC Parking Standards. Cycle parking will be available throughout all public areas in Welborne, particularly in areas of high footfall such as the District Centre and Schools. Cycle parking locations should be well lit, have high levels of natural surveillance, be as close as possible to the destination and allow for bike locking.
- Parking provision for schools should be assessed in relation to the agreed travel plan for each location, and again should be kept to a minimum to help reinforce sustainable and healthy modes of movement to the schools. Drop-off and pick-up areas for vehicles should be discouraged, but details for each site are to be agreed with FBC and HCC.
- Two car parks for access to the SANGs will be provided, one off Knowle Road on the western boundary of the site to access the Welborne Mile and Dashwood to the north, and a second off Funtley Hill for access to Fareham Common and the Welborne Mile. These will include provision for horse box parking.



In verge parking space 2.5m x 7m with a 90 degree kerb return and change of surface paving slab strip where parking abuts the cycleway



The location and design of non-residential parking shall be an important consideration in the design of streets at Welborne. It can be accommodated as bays within verges, in public spaces or in perpendicular arrangements



# 7. STREET LAYOUT

## 7a. PRINCIPAL STREET TYPES

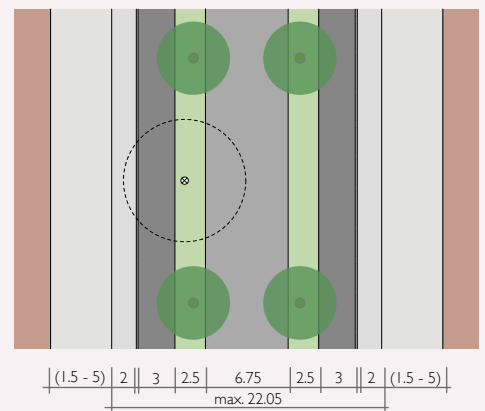
The patterns of movement that are laid out by streets often have a longevity far greater than the buildings that front onto the spaces. Hence great care shall be taken in the design and layout of the streets. This section sets out the key criteria for street design at Welborne. Each street form is described in terms of design criteria, typical dimensions, cross section, plan form and precedent examples.

The street network at Welborne comprises of typical streets as illustrated in the matrix of types opposite. In addition to these standard streets and paths are the bespoke conditions of Welborne Way and Knowle Road. These routes are two of the most important movement connections within Welborne.



### WELBORNEWAY

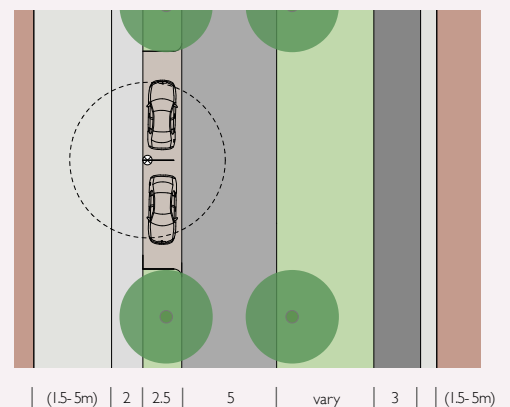
Welborne Way is the principal north-to-south movement route through Welborne, providing a connection to the M27. It shall be important to consider its role both as a vehicular movement route but also one that is conducive to pedestrian and cycle movements.



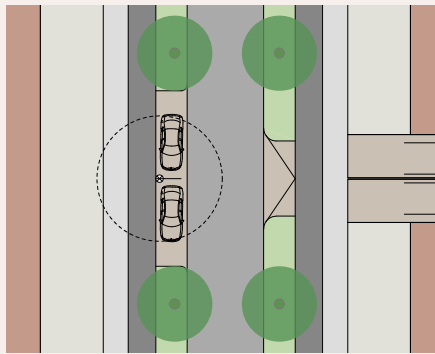
### KNOWLE ROAD

Knowle Road is an existing 50mph road connecting Knowle village to the Wickham Road.

Knowle Road will take on a new character as a residential street with a reduced speed limit of 30mph.

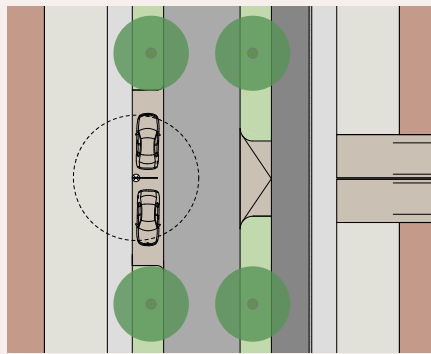


# PRINCIPAL STREET TYPES USED ACROSS WELBORNE



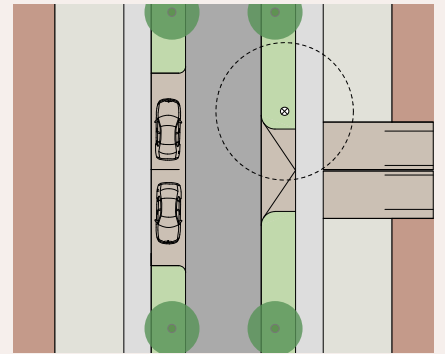
|(1.5 - 5)| 2 | 2 | 2.5 | 6.1 | 2.5 | 2 | |(1.5 - 5)|  
max. 19.5

PRIMARY STREET



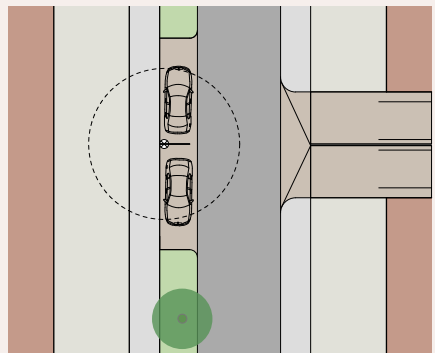
|(1.5 - 5)| 2 | 2.5 | (5.5 - \*6.1) | 2.5 | 3 | 2 | |(1.5 - 5)|  
max. 18.3

SECONDARY STREET  
(\*6.1 ONLY FOR BUS ROUTES)



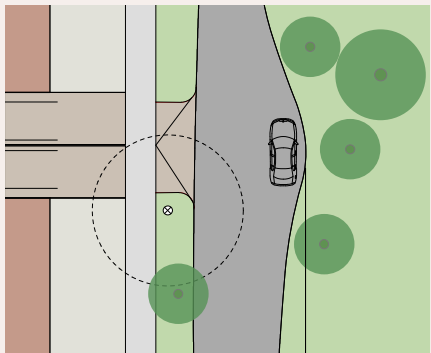
|(1.5 - 5)| 2 | 2.5 | (4 - 5.5) | 2.5 | 2 | |(1.5 - 5)|  
max. 14.5

TERTIARY STREET - OPTION 1



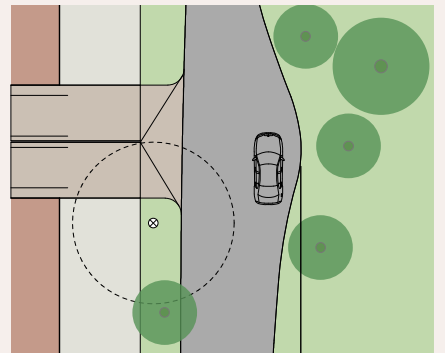
|(1.5 - 5)| 2 | 2.5 | 4 - 5.5 | 2 | |(1.5 - 5)|  
max. 12

TERTIARY STREET - OPTION 2



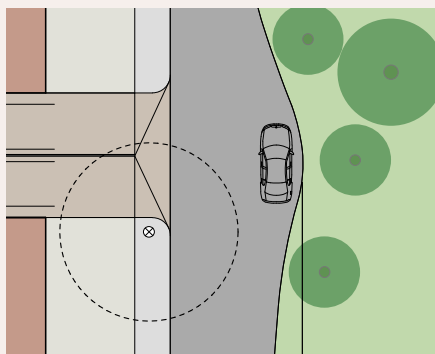
|(1.5 - 5)| 2 | (0.5 - 2.5) | (3.7 - 7.5)|  
max. 12

EDGE LANE - OPTION 1



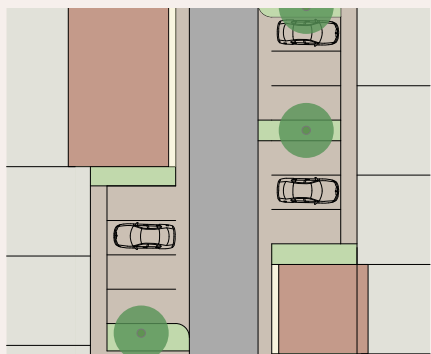
|(1.5 - 5)| (0.5 - 2.5) | (3.7 - 7.5)|  
max. 10

EDGE LANE - OPTION 2



|(1.5 - 5)| 2 | (3.7 - 7.5)|  
max. 12

EDGE LANE - OPTION 3



7.2 | 5 | 7.2 |  
max. 19.4

COURTYARD LANE

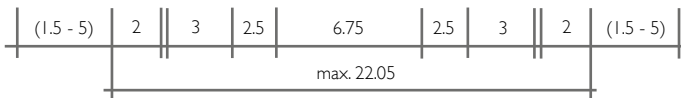
## KEY

- |  |                            |  |                 |  |             |
|--|----------------------------|--|-----------------|--|-------------|
|  | Building block             |  | Cycleway        |  | Tree        |
|  | Privacy strip/front garden |  | Shared cycleway |  | Carriageway |
|  | Footpath                   |  | Tree verge      |  | Parking     |
|  | Segregation strip          |  | Street lamp     |  |             |

All measurements in metres



# WELBORNE WAY

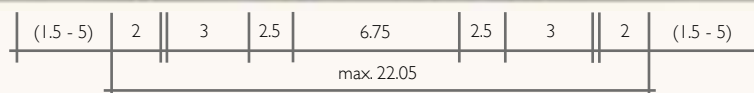


All measurements in metres

Welborne Way is the main north–south route through Welborne. Its characteristics will include:

- a generous carriageway with dedicated cycleways in both directions
- a tree verge and footway on both sides
- taller buildings between three- to five-storeys high fronting onto the road
- a tree verge and footway on both sides with tree and planting proposal compatible with SuDS system. Refer to Strategic Design Code for details.

Welborne Way will connect and pass through a number of the principal centres within the settlement including the Village Centre and District Centre. These are opportunities for 'special' junctions and places that emphasise the urban settings.





### STREET TYPE: WELBORNE WAY

Character	Principal movement route, wider, busier, dedicated cycle facilities, taller buildings.
Design speed	30 mph

### DESIGN ELEMENTS

Desired Radii	6.0m (vehicle tracking to be used)
Trees	In verge
Lighting	✓
Bus route	✓
On-street car parking	None
Traffic calming	Junction spacing, squares, bends, positioning of buildings and trees, activity
Utilities	Under footway
Drainage channels	At edge

### MATERIALS

Materials palette	Typical treatment
-------------------	-------------------

# WELBORNE WAY

## LINK CAPACITY

A VISSIM micro simulation model has been prepared to provide data on the traffic implications within the internal Welborne highway network, specifically Welborne Way.

The coding of the VISSIM model has considered the required street width of Welborne Way of 6.75m. Outputs from the model have confirmed that users of Welborne Way would not experience material delays and free flow of traffic would not be compromised.

Examples of the average speeds of traffic using Welborne Way during peak times have been identified using 'Heat Maps' extracted from the VISSIM model. Yellow sections of the Heat Map indicate average vehicle speeds of 30 mph. Given the absence of significant junctions formed with Welborne Way, the majority of Welborne Way will see average traffic speeds of 30 mph being achieved, confirming that sufficient link capacity will be available.

## FRONTAGE ACTIVITY

There will be frontages along Welborne Way to provide a high-quality urban environment with a strong sense of place. The frontages will provide good passive surveillance and encourage active travel along the length of Welborne Way. Frontages will mostly be residential. However, there will be distinct areas of leisure and commercial units, in areas close to the Village Centre to the north of Welborne Way, and the District Centre to the south. No further new access points will be facilitated from these centres onto Welborne Way. The centres will be serviced either through access points currently proposed on Welborne Way or by the wider street network.

However, there will be minimal direct accesses onto Welborne Way, as this would compromise the traffic capacity and lead to interruptions of the proposed footway and cycleways.

## PARKING RESTRICTIONS

Double yellow lines (Dia 1018.1) will restrict on-street parking along Welborne Way. The gap between the edge of the carriageway and the nearest edge of the longitudinal line shall be approximately 250mm. The lines will be 50mm wide, with a 50mm gap between the lines; they will be painted in No 353 (Deep Cream).



Right: No 353 (Deep Cream)

## JUNCTION LOCATIONS AND DESIGN

The main junction on Welborne Way is at the intersection with Dashwood Avenue.

Other junctions along the route shall be priority junctions with passing bays per CD123 Figure 6.25N2.

See Section 7 for diagrams of typical junctions on Welborne Way.

## MINIMUM CENTRELINE CURVE RADII

The design speed for Welborne Way will be 30 mph/48 kph; the minimum centreline curve radii along Welborne Way will be 41m, as per Table 8.1 of Manual for Streets 2.

## FOOTWAY AND CYCLEWAY DETAILS

To encourage active transport, Welborne Way will have a segregated two-way cycle and pedestrian route on both sides of the carriageway. A 150mm channel block will provide segregation between the pedestrian and cycle routes.



Above: Visualisation of Welborne Way

Segregated routes will be provided in preference to shared space routes as they are safer for visually impaired users and young children; they also provide better facilities for cyclists.

Cycleways will be 3m wide, to accommodate two-way cycle traffic, recumbents and child's trailers.

Footways will be 2m wide to allow buggies or wheelchairs to pass each other.

#### **PUBLIC TRANSPORT PROVISION**

There will be a proposed bus route along Welborne Way. To avoid interrupting traffic flows, bus stops shall be provided in lay-bys. The Bus Rapid Transit (BRT) route will run along Welborne Way. However, no specific BRT infrastructure will be required to facilitate this, as the route provides sufficient traffic capacity and queuing is not expected.

## WELBORNE WAY

### PHASING AND DELIVERY

Welborne Way will be delivered in 2 phases

**Phase 1 - Welborne Way (Knowle Road to Broadway) Works** - the works consisting of the provision of a vehicular link between Knowle Road and Broadway (to include the construction of Welborne Way and the construction of a junction at Knowle Road and the construction of the vehicular link to Broadway) as shown in principle on plan 7328\_104 Rev D and as agreed in accordance with any Highways Agreement;

**Phase 2 - A32/Welborne Way Roundabout Works**  
- the provision of a permanent vehicular roundabout

access onto the A32 as shown in principle on the plan 6091/GA/311 Rev G including the shared use route extension on the southern arm to the "A32 / Knowle Road / Chalk Lane Roundabout Works and as agreed in accordance with any Highways Agreement.

It is important that these junctions are delivered in a timely manner as their main purpose is to alleviate congestion and delays on the A32. Although the transport assessment demonstrated the Welborne Way is only required prior to the occupation of 1,851 units and the roundabout by 2,601 units Buckland, as master developer, will monitor the capacity of Knowle Road and Broadway Roundabout annually from the

Phase 1 - Welborne Way (Knowle Road to Broadway) Works



occupation of 1,160 units. In the event that the RFC values exceed 0.75 on any one arm of the Knowle Road and Broadway Roundabouts, WLL will complete the construction of Welborne Way between Broadway Roundabout to the south and Knowle Road to the north within 12 months. If the RFC values do not exceed 0.75 Buckland will complete the road prior to

- Occupation of 1851 Residential Units within Area X; or
- Occupation of any Residential Unit or Commercial Unit within Area Y; or
- More than 25% Occupation of any land use with the Employment Area;

Once Welborne Way is open to traffic Buckland will continue to monitor Knowle Road and Broadway Roundabout, in the event the RFC values exceed 0.75 on any one arm of the Knowle Road and Broadway Roundabouts, WLL will commence the construction of Welborne Way Roundabout within 6 months. In order to safeguard the earlier delivery of the roundabout, if required, Buckland will submit a S278 preliminary design check prior to the occupation of the 700th units. If the RFC values do not exceed 0.75 Welborne Way Roundabout will be complete prior to the occupation of 2,601st unit

Phase 2 - A32/Welborne Way Roundabout Works



## WELBORNE WAY: PLANTING

Effect / Character	<ul style="list-style-type: none"> <li>• Formal avenue tree planting with native grassland rich in local wildflora</li> <li>• Continous, consistent character through three Landscape Character Areas</li> </ul>
Arrangement	<ul style="list-style-type: none"> <li>• Trees located centre to the verge strip at regular intervals</li> <li>• Specimen trees placed at junctions or in strategic locations shall enhance and frame views</li> <li>• Native species-rich grassland beneath</li> <li>• Street light columns distance to be min. 5m from tree stem. Refer to lighting column guidance</li> <li>• Tree planting to provide a continuous canopy effect and enhance both pedestrain and cyclist experience</li> </ul>
Tree type	<ul style="list-style-type: none"> <li>• Trees to have neat, conical crown canopy shape</li> <li>• Large tree species over 10m</li> <li>• Tree species compatible with SuDS system where located within swales</li> <li>• Semi-mature single clear-stem species (min 2.1m) to avoid visibility issues and clashes with vehicles</li> <li>• Seasonal interest trees as landmak trees are supported in association with footway junctions and resting places</li> </ul>
Verge Types	<ul style="list-style-type: none"> <li>• Species-rich grassland with diverse native wildflora to provide functional biodiversity gain and aesthetic benefit for street character and quality. The diverse grassland overlies a permeable tree planting zone as a continuous trench that will support healthy establishment and long-term growth. Careful placement of root directing barrier will protect below-ground utilities. Surface water will attenuate via the root zone by the sensitively integrated drainage design, enabling vegetation to support silt and nutrient level reduction. from surface water run-off. The cutting regime will maintain a high-quality appearance, for higher infiltration rates and to encourage species diversity</li> </ul>



**INDICATIVE STREET TREES**



1. *Quercus palustris*
2. *Platanus x hispanica*
3. *Fagus sylvatica*

SPECIES MAY INCLUDE	GIRTH (cm)	SOIL VOLUME (m <sup>3</sup> min)
<i>Quercus palustris</i> (Pin Oak, Large)	35-45	36m <sup>3</sup> of Stockholm System, which is equivalent to 28m <sup>3</sup> of Topsoil
<i>Platanus x hispanica</i> (London Plane, Large)	35-45	
<i>Fagus sylvatica</i> (Beech, Large)	35-45	

**INDICATIVE LANDMARK TREES**



1. *Liquidambar styraciflua*
2. *Liriodendron tulipifera*
3. *Quercus robur*

SPECIES MAY INCLUDE	GIRTH (cm)	SOIL VOLUME (m <sup>3</sup> min)
<i>Liquidambar styraciflua</i> (Sweet Gum, Large)	35-45	36m <sup>3</sup> of Stockholm System, which is equivalent to 28m <sup>3</sup> of Topsoil
<i>Liriodendron tulipifera</i> (Tulip Tree, Large)	35-45	
<i>Quercus robur</i> (Pedunculate Oak, Large)	35-45	

**INDICATIVE VERGE GRASSLAND**

**SPECIES MAY INCLUDE**

A carefully selected combination of finer, low-growing grass species as an open matrix for wildflora:

- Birds-foot-trefoil, Buttercup
- Clover
- Cowslip
- Eyebright
- Knapweed
- Lawn Chamomile
- Ragged Robin
- Selfheal
- Yarrow

Species selection to respond to Landscape Character Area



# KNOWLE ROAD



Knowle Road is a one-off secondary street. It is based on the alignment of the existing road, with some realignment. The existing 50mph speed limit will be lowered. It retains existing planting where possible and introduces additional tree planting. Planting should celebrate the Woodland Landscape Character Area.

Verge planting includes existing grassland planting where retention is possible on the southern verge with lawn and meadow planting on the northern verge.



Note: This is an existing shared cycle/pedestrian route

All measurements in metres





### STREET TYPE: KNOWLE ROAD

Character Woodland and Downland Landscape Character Areas

Design speed Exiting 50mph to be lowered

### DESIGN ELEMENTS

Desired Radii 6.0m

Trees In verge

Planting character Bespoke character incorporating existing planting. Planting responds to Landscape Character Area

Lighting ✓

Bus route N/A

On-street car parking Parallel

Traffic calming Junction spacing, squares, positioning of buildings and trees, activity

Utilities Existing and proposed under footway and cycle route

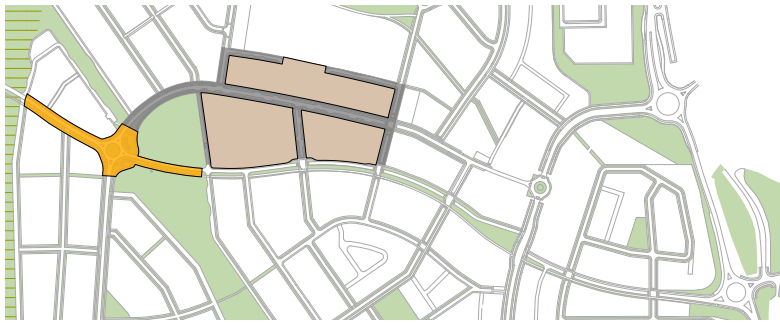
Drainage channels At edge

### MATERIALS

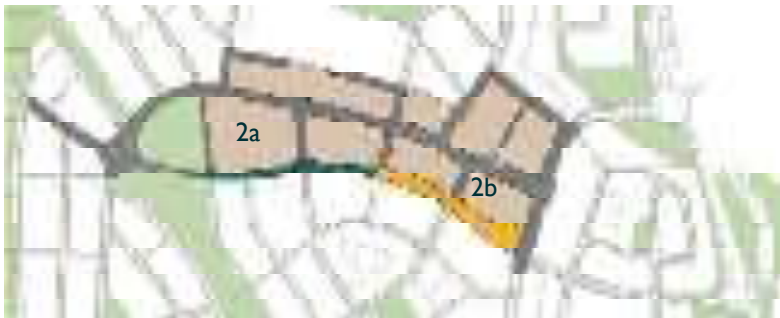
Materials palette Typical treatment

# KNOWLE ROAD

## PHASING AND DELIVERY



**Phase 1** – Construction works to Knowle Road from the western site boundary to Welborne Park Roundabout. This section of Knowle Road to remain 6.7m in width.



**Phase 2** – Construction works to Knowle Road from Welborne Park to Welborne Way. Road width reduced to 5.5m. 2a delivered with adjacent residential units 2b delivered with Village Centre.



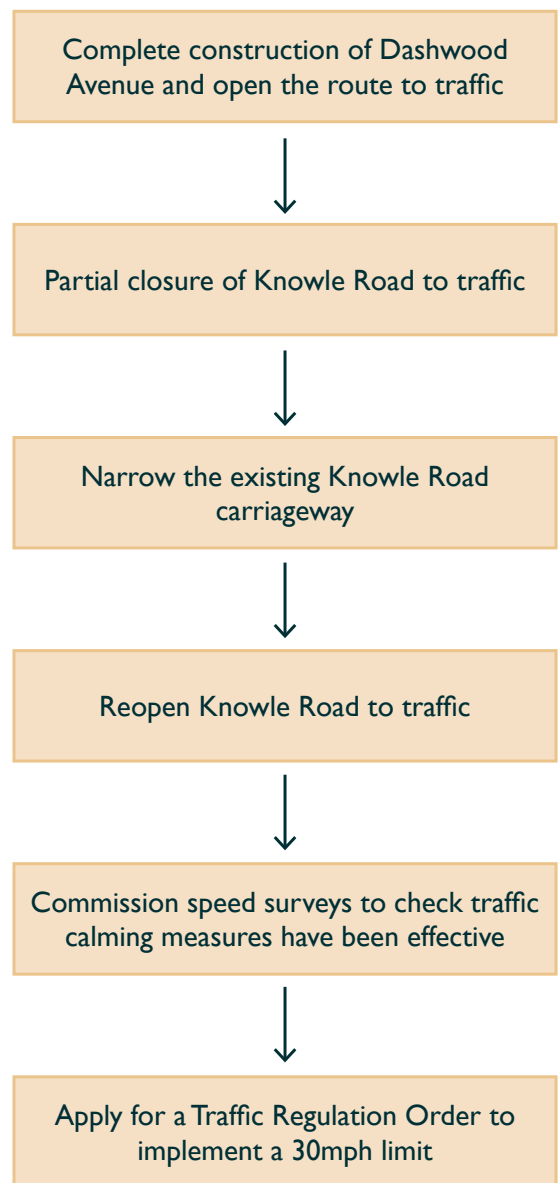
**Phase 3** – Construction works to Knowle Road from Welborne Way to A32. Road width reduced to 5.5m.

## SPPED CONTROL CAPACITY

To reduce the travelling speed along Knowle Road it shall be narrowed to 5.5m.

The provision of the raised junctions will slow traffic.

Where Knowle Road crosses Welborne Way, the junctions will be staggered to reduce conflict at the crossing. The cycleway and footpath shall remain on the current and most direct alignment.



# KNOWLE ROAD: PLANTING



1. Northern verge: Formal tree spacings, Medium street trees with landmark trees at junctions or ends of parking bays. Use of smaller ornamental multistem trees and hedge species within understory verge
2. Southern verge: Informal spacings, individual trees, clusters and groups, retaining existing trees and shrub planting where possible, inclusion of rich understory of hedge/shrub species and flowering and ornamental multistems
3. Existing planting retained where possible
4. Additional tree planting within retained grassland area
5. Proposed verge and planting to respond to Woodland Landscape Character Area
6. Hedgerows species to respond to Woodland Landscape Character Area

INDICATIVE TREES	SPECIES MAY INCLUDE	GIRTH (cm)	SOIL VOLUME (m <sup>3</sup> min)
	<b>Northern verge: Street trees</b>		
	Acer campestre (Field Maple, Medium)	30 - 40	26m <sup>3</sup> of Stockholm System, which is equivalent to 20m <sup>3</sup> of Topsoil
	Alnus cordata (Italian Alder, Medium)	30 - 40	
	Ulmus 'New Horizon' (resistant Elm, Medium)	30 - 40	
	<b>Northern verge: Landmark and ornamental street trees</b>		
	Juglans regia (Walnut, Large)	30-40	36m <sup>3</sup> of Stockholm System, which is equivalent to 28m <sup>3</sup> of Topsoil
	Quercus robur (Pedunculate Oak, Large)	30-40	
	Tilia cordata (Lime, small-leaved, Large)	30-40	
	<b>Southern verge: Street trees</b>		
	Existing retained trees and shrubs		
	Acer campestre (Field Maple)		
	Prunus Avium (Wild Cherry)		
	Corylus avellana (Hazel)		
	Quercus robur (Oak)		

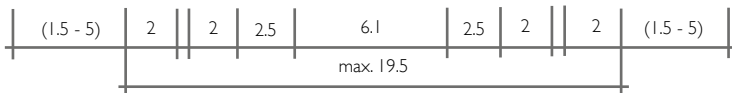
## PRIMARY STREETS



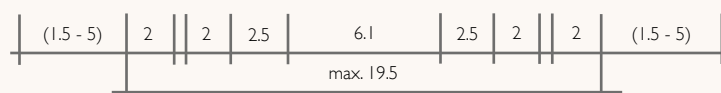
Primary streets provide the main green infrastructure within the masterplan. They are the widest streets, with footways and tree verges on either side and taller buildings than on other routes.

These streets are planted with large single tree species selected for their resilience and provision of important habitat. Large canopies will soften and integrate the development within the landscape.

Primary streets will include one way cycle lanes on separate sides of the street.



All measurements in metres





## STREET TYPE: PRIMARY STREETS

Character	More formal design, constant cross section, larger trees, important routes
Design speed	20 mph

## DESIGN ELEMENTS

Desired Radii	6.0m (vehicle tracking to be used)
Trees	In verge
Lighting	✓
Bus route	N/A
On-street car parking	Parallel or chevron (unmarked)
Traffic calming	Junction spacing, squares, bends, positioning of buildings and trees, activity
Utilities	Under footway
Drainage channels	At edge

## MATERIALS

Materials palette	Typical treatment
-------------------	-------------------

# PRIMARY STREETS

Effect / Character	<ul style="list-style-type: none"> <li>• Formal tree planting with verge planting</li> <li>• Continous consistent character through 4no. landscape character areas</li> </ul>
Arrangement	<ul style="list-style-type: none"> <li>• Trees located centre to the verge strip at regular intervals</li> <li>• Single species throughout</li> <li>• Specimen trees placed at junctions or in strategic locations shall enhance and frame views</li> </ul>
Tree type	<ul style="list-style-type: none"> <li>• Tall, large tree species over 10m</li> <li>• Trees to have neat, conical crown canopy shape</li> <li>• Single clear-stem species are supported to avoid visibility issues</li> <li>• Semi-mature types are encouraged to balance with the height of proposed buildings along this street type</li> <li>• Flowering and fruiting trees as landmark trees are supported in association with secondary street junctions</li> <li>• Tree planting to avoid fruiting tree species if associated with on-street parking underneath</li> </ul>
Verge Type	<ul style="list-style-type: none"> <li>• Species-rich grassland with diverse native wildflora to provide functional biodiversity gain and aesthetic benefit for street character and quality. The diverse grassland overlies a permeable tree planting zone as a continuous trench that will support healthy establishment and long-term growth. Careful placement of root directing barrier will protect below-ground utilities. Surface water will attenuate via the root zone by the sensitively integrated drainage design, enabling vegetation to support silt and nutrient level reduction. from surface water run-off. The cutting regime will maintain a high-quality appearance, for higher infiltration rates and to encourage species diversity</li> </ul>



**INDICATIVE STREET TREES**



1. *Carpinus betulus*
2. *Corylus colurna*
3. *Fagus sylvatica*
4. *Tilia cordata*

SPECIES MAY INCLUDE	GIRTH (cm)	SOIL VOLUME (m <sup>3</sup> min)
<i>Carpinus betulus</i> (Hornbeam, Large)	35-45	36m <sup>3</sup> of Stockholm System, which is equivalent to 28m <sup>3</sup> of Topsoil
<i>Corylus colurna</i> (Turkish Hazel, Large)	35-45	
<i>Fagus sylvatica</i> (Beech, Large)	35-45	
<i>Tilia cordata</i> (Small Leaf Lime, Large)	35-45	

**INDICATIVE LANDMARK TREES**



1. *Juglans regia*
2. *Liriodendron tulipifera*
3. *Pinus sylvestris*

SPECIES MAY INCLUDE	GIRTH (cm)	SOIL VOLUME (m <sup>3</sup> min)
<i>Juglans regia</i> (Walnut, Large)	35-45	36m <sup>3</sup> of Stockholm System, which is equivalent to 28m <sup>3</sup> of Topsoil
<i>Liriodendron tulipifera</i> (Tulip Tree, Large)	35-45	
<i>Pinus sylvestris</i> (Scots Pine, Large)	35-45	

Species selection to respond to Landscape Character Area

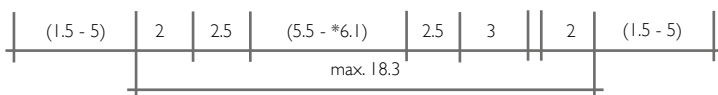


## SECONDARY STREETS

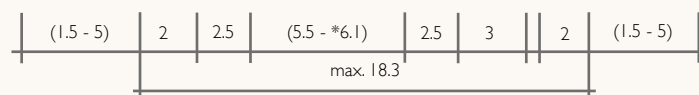


Secondary streets are the arteries that link the busier primary street network to the heart of each neighbourhood, providing key routes for the tertiary streets and edge lanes to connect into.

Planting will reflect and celebrate the Landscape Character Areas within which the secondary street is located and the existing soil conditions. Verge planting will be predominantly lawn with the option of meadow planting and highlight planting that may be used to enhance spaces such as key junctions, public buildings and school entrances.



All measurements in metres. \*6.1 only for bus routes





## STREET TYPE: SECONDARY STREETS

Character	Human scale, tree lined, low traffic volume and speed residential areas.
Design speed	20 mph

## DESIGN ELEMENTS

Desired Radii	2.0m (vehicle tracking to be used)
Trees	In verge
Planting character	Responds to 4no. Landscape Character Areas.
Lighting	✓
Bus route	N/A
On-street car parking	Parallel (unmarked)
Traffic calming	Junction spacing, squares, bends, positioning of buildings and trees, activity
Utilities	Under footway
Drainage channels	At edge

## MATERIALS

Materials palette	Typical treatment
-------------------	-------------------

**INDICATIVE STREET TREES ALONGSIDE FOOTWAYS**



1. *Acer campestre*
2. *Alnus cordata*
3. *Ulmus 'New Horizon'*

SPECIES MAY INCLUDE	GIRTH (cm)	SOIL VOLUME (m <sup>3</sup> min)
<i>Acer campestre</i> (Field Maple, Medium)	30-40	26m <sup>3</sup> of Stockholm System, which is equivalent to 20m <sup>3</sup> of Topsoil
<i>Alnus cordata</i> (Italian Alder, Medium)	30-40	
<i>Ulmus 'New Horizon'</i> (Resistance Elm, Medium)	30-40	

**INDICATIVE STREET TREES ALONGSIDE CYCLEWAYS**

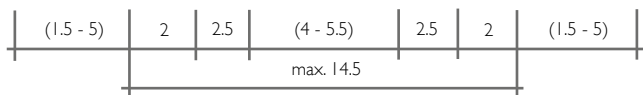


1. *Carpinus betulus*
2. *Fagus sylvatica*
3. *Tilia cordata*

SPECIES MAY INCLUDE	GIRTH (cm)	SOIL VOLUME (m <sup>3</sup> min)
<i>Carpinus betulus</i> (Hornbeam, Large)	35-45	36m <sup>3</sup> of Stockholm System, which is equivalent to 28m <sup>3</sup> of Topsoil
<i>Fagus sylvatica</i> (Beech, Large)	35-45	
<i>Tilia cordata</i> (Small Leaf Lime, Large)	35-45	

Species selection to respond to Landscape Character Area

## TERTIARY STREETS 1

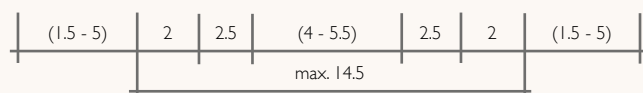


All measurements in metres

Tertiary streets are the most common street type at Welborne and will primarily be low-trafficked residential streets. The carriage way width can vary, depending on the status of the street and intended character.

Access to and from houses plays an important role in the design of tertiary streets. The design needs to both establish a sense of privacy and sense of community. Their ability to contribute to placemaking will be crucial to the development's success.

Tertiary streets will use similar planting types as secondary streets to maintain visual consistency and enhance Landscape Character Areas. They will use a wider variety of smaller tree species, particularly flowering, fruiting and nut-bearing varieties of benefit to wildlife. Planted verges provide an opportunity to maintain the distinctiveness of each Landscape Character Area via wild flower and grass mixtures. Variation in planting treatment for private front gardens shall also reflect Landscape Character Areas. Species will complement fence systems or retaining walls. Where used as private boundary treatments, hedgerows will respond to visibility and safety requirements when associated with access and egress to private dwellings.





## STREET TYPE: TERTIARY STREETS

Character	Human scale, tree lined, low traffic volume and speed residential areas
Design speed	20 mph

## DESIGN ELEMENTS

Desired Radii	2.0m (vehicle tracking to be used)
Trees	In verge
Planting character	Responds to 4no. Landscape Character Areas
Lighting	✓
Bus route	N/A
On-street car parking	Parallel, intermittent within verge (unmarked)
Traffic calming	Junction spacing, squares, bends, positioning of buildings and trees, activity
Utilities	Under footway
Drainage channels	At edge

## MATERIALS

Materials palette	Typical treatment
-------------------	-------------------

**INDICATIVE STREET TREES**



1. Acer campestre
2. Alnus cordata
3. Ulmus 'New Horizon'

SPECIES MAY INCLUDE	GIRTH (cm)	SOIL VOLUME (m <sup>3</sup> min)
Acer campestre (Field Maple, Medium)	30-40	26m <sup>3</sup> of Stockholm System, which is equivalent to 20m <sup>3</sup> of Topsoil
Alnus cordata (Italian Alder, Medium)	30-40	
Ulmus 'New Horizon' (Resistance Elm, Medium)	30-40	

**INDICATIVE LANDMARK TREES**

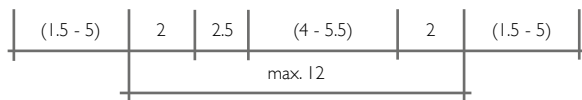


1. Juglans nigra
2. Maytenus boaria

SPECIES MAY INCLUDE	GIRTH (cm)	SOIL VOLUME (m <sup>3</sup> min)
Juglans nigra (Black Walnut, Large)	35-45	36m <sup>3</sup> of Stockholm System, which is equivalent to 28m <sup>3</sup> of Topsoil
Maytenus boaria (Mayten, Large)	35-45	

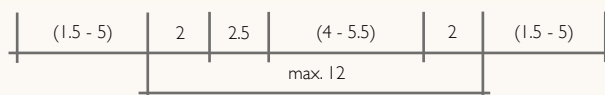
Species selection to respond to Landscape Character Area

## TERTIARY STREETS 2



Tertiary streets 2 are a variant of the tertiary street type that has a grassed verge to only one side of the street, with a single line of tree planting. It shall be used for lower-status streets across Welborne.

All measurements in metres

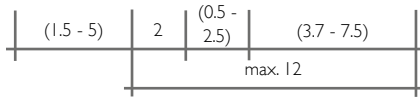




Example of tertiary street 2 type



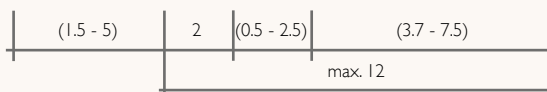
# EDGE LANES 1



All measurements in metres

Edge lanes are found on the edges of the Garden Village. They are the interface between the development and open spaces, such as along the northwestern edges facing the Welborne Mile or Dashwood. For these types of road, there is likely to be:

- A carriageway capable of accommodating a single lane of traffic in either direction with a footway on one side
- Homes and private front gardens fronting on to the carriageway on both sides, or on just one side with open space on the other side





## STREET TYPE: EDGE LANES

Character Shared routes for all modes on green edges of Welborne. Low speed, variable width, level surface, informal parking.

Design speed 10 mph

## DESIGN ELEMENTS

Desired Radii N/A

Trees At edges

Planting character Responds to 4no. Landscape Character Areas

Lighting To be agreed based on location and Landscape Character Area

Bus route N/A

On-street car parking Parallel, informal (unmarked)

Traffic calming Narrowing to 3.7m, car parking

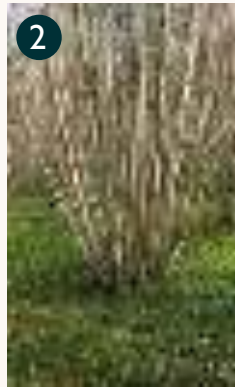
Utilities In adjacent green space

Drainage channels At edge

## MATERIALS

Materials palette Typical treatment

INDICATIVE STREET TREES ALONGSIDE FOOTWAYS



1. *Acer campestre*
2. *Corylus avellana*
3. *Sorbus torminalis*

SPECIES MAY INCLUDE	GIRTH (cm)	SOIL VOLUME (m <sup>3</sup> min)
<i>Acer campestre</i> (Field Maple, Medium)	30-40	26m <sup>3</sup> of Stockholm System, which is equivalent to 20m <sup>3</sup> of Topsoil
<i>Corylus avellana</i> (Hazel Coppice, Medium)	30-40	
<i>Sorbus torminalis</i> (Wild Service Tree, Medium)	30-40	

INDICATIVE STREET TREES ALONGSIDE CYCLEWAYS

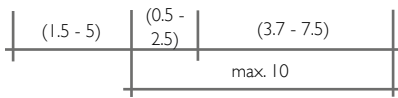


1. *Quercus robur*
2. *Fagus sylvatica*
3. *Tilia cordata*

SPECIES MAY INCLUDE	GIRTH (cm)	SOIL VOLUME (m <sup>3</sup> min)
<i>Quercus robur</i> (Pedunculate Oak, Large)	35-45	36m <sup>3</sup> of Stockholm System, which is equivalent to 28m <sup>3</sup> of Topsoil
<i>Fagus sylvatica</i> (Beech, Large)	35-45	
<i>Tilia cordata</i> (Small Leaf Lime, Large)	35-45	

Species selection to respond to Landscape Character Area

## EDGE LANES 2



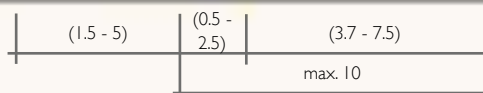
All measurements in metres

The planting character of edge lanes should respond to the Landscape Character Area it is located within and the open space it is fronting.

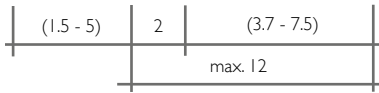
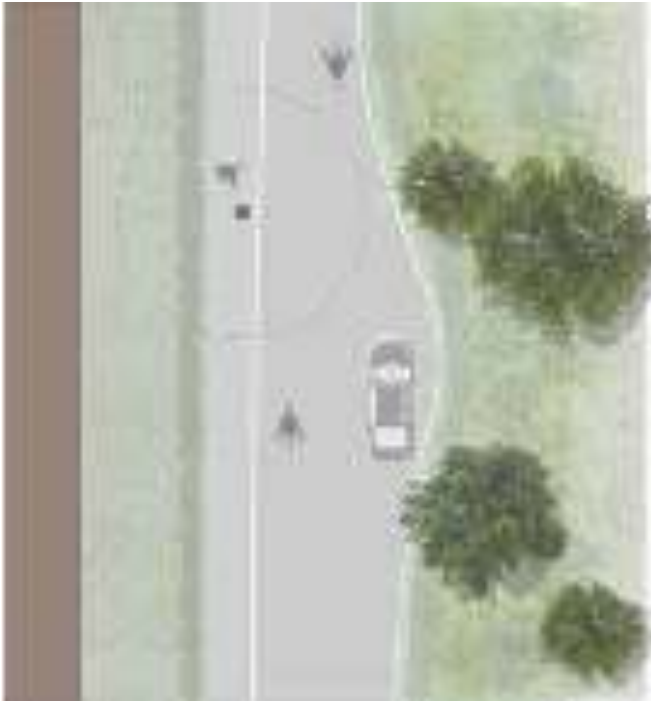
Tree verges may be combined with parking spaces. Trees within verges may vary between single to multi-stem, and will use smaller species corresponding to the Landscape Character Area.

Trees may be planted at irregular intervals to offer an informal, looser character. (For trees within open space refer to the Strategic Design Code.)

Boundary treatments vary between Landscape Character Areas. These may be hedgerows, fencing or earth mounding. They should be appropriate for the anticipated use of the adjacent open space.



# EDGE LANES 3

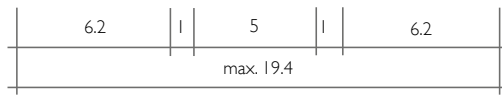


All measurements in metres





## COURTYARD LANES

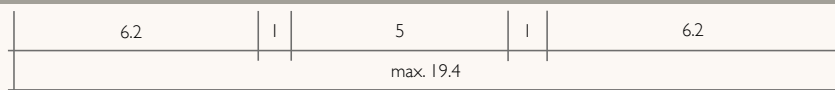


All measurements in metres

Courtyard lanes provide a secondary network of movement routes. They are shared surface streets providing vehicular and parking access to the rear of properties. The design should prioritise pedestrian movement.

Courtyard lanes shall be used by refuse vehicles for collections and so the lanes need to be designed and vehicle tracked to accommodate this.

It shall be important that sufficient space is allowed for the inclusion of trees and planting areas. This shall be used to break up runs of parking and rear boundaries and to make the lanes enjoyable routes for pedestrians and cyclists.





## STREET TYPE: COURTYARD LANES

Character	Informal combining residential parking and pedestrian and cycle movement routes.
Design speed	20 mph

## DESIGN ELEMENTS

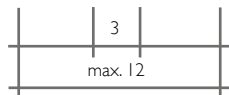
Desired Radii	6.0m (vehicle tracking to be used)
Trees	Between parking spaces, adjacent to boundary walls
Planting character	Responds to 4no. Landscape Character Areas
Lighting	✓
Bus route	N/A
On-street car parking	Allocated private parking with some visitor parking
Traffic calming	Bends, narrowings, positioning of buildings, trees, activity
Utilities	In designated service margin
Drainage channels	At edge or centrally

## MATERIALS

Materials palette	Typical treatment
-------------------	-------------------



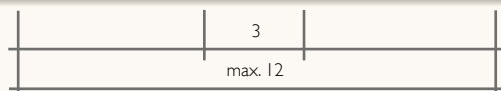
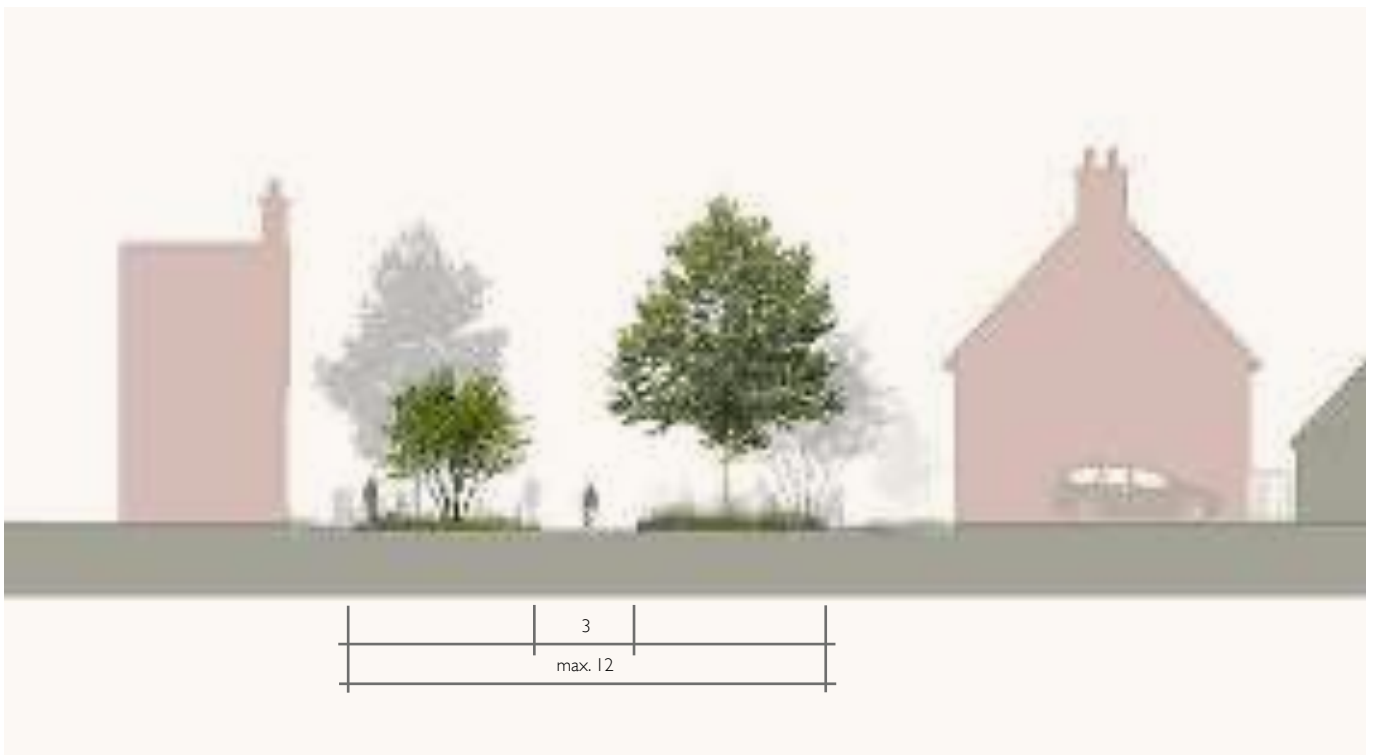
## GREENWAYS



All measurements in metres

Greenways provide multifunctional, continuous green routes through the development. They are a key part of the green infrastructure that:

- Provide site-wide strategic east–west non-vehicle infrastructure for pedestrians, cyclists and horse riders
- Incorporate existing, diverted or upgraded Public Right of Ways
- Contain medium–large tree planting to break up the visual mass of the development when viewed from the south
- Generally have development either side
- Incorporate neighbourhood play and fitness trails, as per the Play Strategy
- Provide a range of natural habitats and continuous corridors for wildlife





- Vary in width to accommodate uses and facilities (min. 12m)
- Prioritise safety, through lighting (where appropriate) and natural surveillance from neighbouring uses
- Be easily accessed at regular intervals without barriers
- Provide resting points

The planting character should respond to the Landscape Character Area it is located within, with a focus on native and natural planting. To achieve this, planting may include species identified in the Strategic Design Code planting appendix.

## STREET TYPE: GREENWAYS

Character	Shared green pedestrian and cycle movement routes
-----------	---

Design speed	N/A
--------------	-----

## DESIGN ELEMENTS

Desired Radii	N/A
---------------	-----

Trees	
-------	--

Planting character	Responds to 4no. Landscape Character Areas
--------------------	--

Lighting	✓
----------	---

Bus route	N/A
-----------	-----

On-street car parking	N/A
-----------------------	-----

Traffic calming	N/A
-----------------	-----

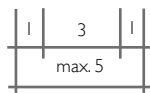
Utilities	
-----------	--

Drainage channels	N/A
-------------------	-----

## MATERIALS

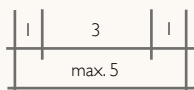
Materials palette	Informal treatment
-------------------	--------------------

## GREEN LINKS

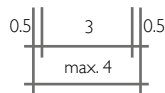


All measurements in metres

Green links provide designated pedestrian and/or cycle movement routes across Welborne. They typically connect open green spaces to the tertiary street network. The width of the green links shall vary but will provide a 3m wide pedestrian and cycle link. They will provide safe spaces, with lighting where appropriate and natural surveillance from neighbouring uses. The landscape design provides opportunities for tree planting, a range of natural habitats to increase biodiversity, places to meet and rest and, in some instances, larger areas that could accommodate local food growing or neighbourhood play spaces. The planting character will respond to the Landscape Character Area within which it is located.



## OPEN SPACE ROUTES



All measurements in metres



Precedent example of an open space route

Open space routes run through the green spaces surrounding the development parcels and provide semi-natural and safe movement routes. They are divided hierarchically:

- Multi-user paths: footway/cycleway/bridleway catering for pedestrians, cyclists and horse riders; some are also combined with upgraded or diverted PRowWs.
- Footways and cycleways: Generally 3m-wide shared paths for pedestrians and cyclists.
- Footways: Formal paths up to 2.5m wide that provide desire lines through the development linking residential areas with the wider footpath network, open spaces and facilities.
- Tertiary footpath: Informal pathways up to 2m wide that provide a more rustic character to residential areas and/or a more convoluted, scenic route through open spaces.

Their design will ensure that:

- Surface finishes for each footway, footpath, cycleway and bridleway are appropriate for its location, purpose and frequency of use. Surfacing to be continuous such as self-binding aggregate or buff-coloured asphalt.
- Routes are of an accessible gradient, appropriately shaded and include regular resting stops.
- Lighting is provided in appropriate locations based on levels of usage; lighting design to consult with ecologists where necessary.
- Routes do not allow access to vehicles except for maintenance and access to infrastructure.
- Planting character responds to the Landscape Character Area it is located within.

Numerous cycle and/or pedestrian only accesses into the development will be provided or enhanced. Open space routes will incorporate signalised and informal crossing points, with the crossing design appropriate to its location and users.

# 7. STREET LAYOUT

## 7a. PRINCIPAL STREET TYPES

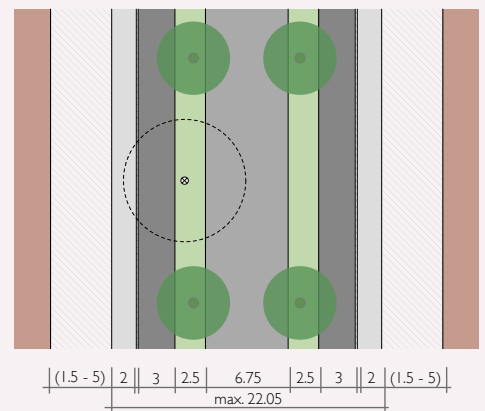
The patterns of movement that are laid out by streets often have a longevity far greater than the buildings that front onto the spaces. Hence great care shall be taken in the design and layout of the streets. This section sets out the key criteria for street design at Welborne. Each street form is described in terms of design criteria, typical dimensions, cross section, plan form and precedent examples.

The street network at Welborne comprises of typical streets as illustrated in the matrix of types opposite. In addition to these standard streets and paths are the bespoke conditions of Welborne Way and Knowle Road. These routes are two of the most important movement connections within Welborne.



### WELBORNEWAY

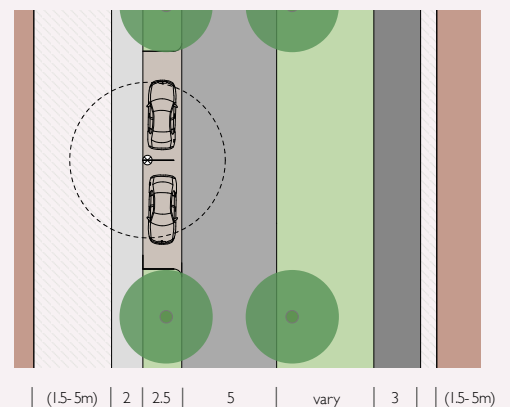
Welborne Way is the principal north-to-south movement route through Welborne, providing a connection to the M27. It shall be important to consider its role both as a vehicular movement route but also one that is conducive to pedestrian and cycle movements.



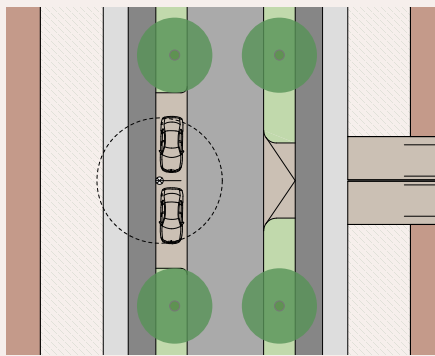
### KNOWLE ROAD

Knowle Road is an existing 50mph road connecting Knowle village to the Wickham Road.

Knowle Road will take on a new character as a residential street with a reduced speed limit of 30mph.

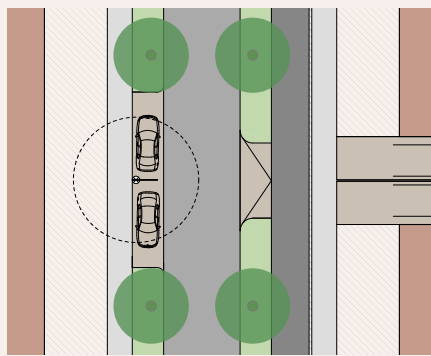


# PRINCIPAL STREET TYPES USED ACROSS WELBORNE



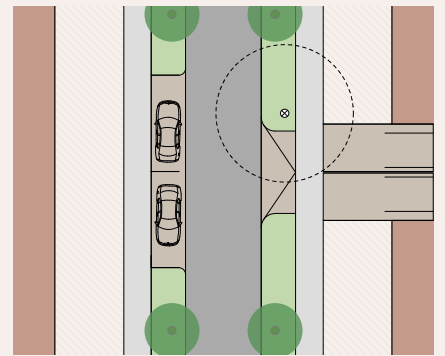
|(1.5 - 5)| 2 | 2 | 2.5 | 6.1 | 2.5 | 2 | |(1.5 - 5)|  
max. 19.5

PRIMARY STREET



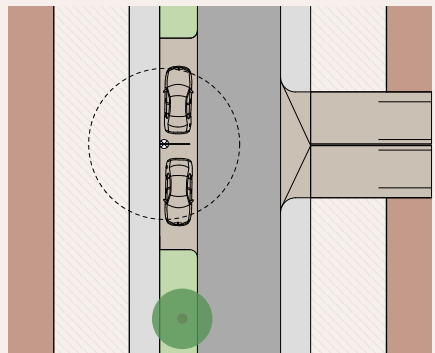
|(1.5 - 5)| 2 | 2.5 | (5.5 - \*6.1) | 2.5 | 3 | 2 | |(1.5 - 5)|  
max. 18.3

SECONDARY STREET  
(\*6.1 ONLY FOR BUS ROUTES)



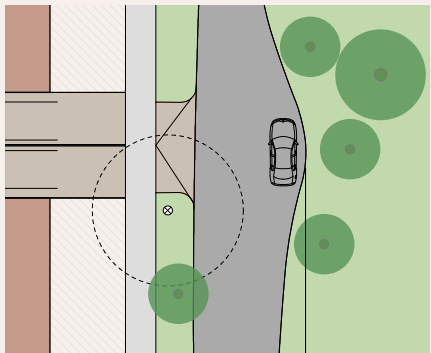
|(1.5 - 5)| 2 | 2.5 | (4 - 5.5) | 2.5 | 2 | |(1.5 - 5)|  
max. 14.5

TERTIARY STREET - OPTION 1



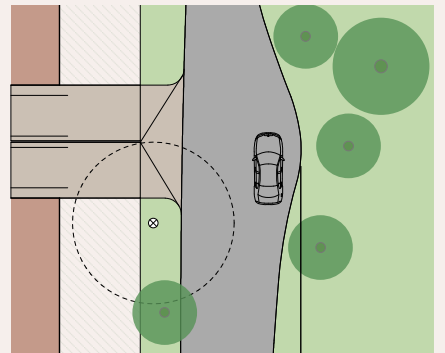
|(1.5 - 5)| 2 | 2.5 | 4 - 5.5 | 2 | |(1.5 - 5)|  
max. 12

TERTIARY STREET - OPTION 2



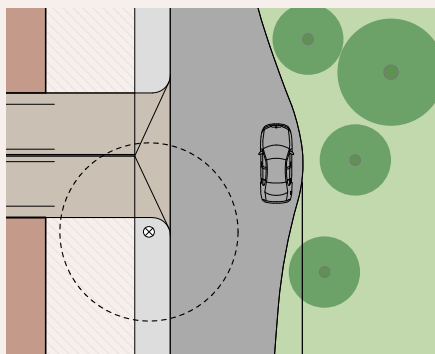
|(1.5 - 5)| 2 | (0.5 - 2.5) | (3.7 - 7.5)|  
max. 12

EDGE LANE - OPTION 1



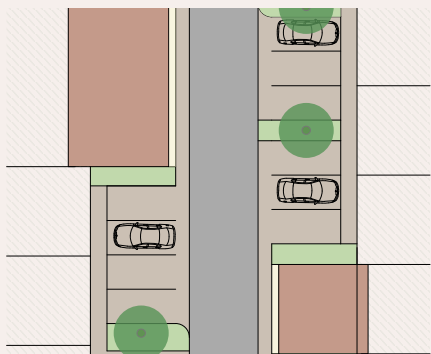
|(1.5 - 5)| (0.5 - 2.5) | (3.7 - 7.5)|  
max. 10

EDGE LANE - OPTION 2



|(1.5 - 5)| 2 | (3.7 - 7.5)|  
max. 12

EDGE LANE - OPTION 3



7.2 | 5 | 7.2 |  
max. 19.4

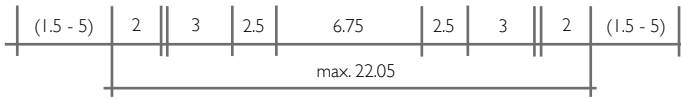
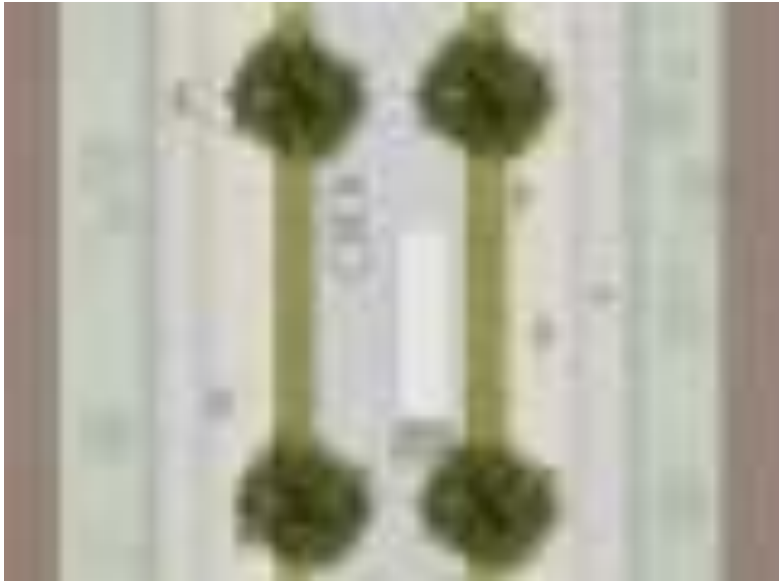
COURTYARD LANE

## KEY

- |  |                            |  |                 |  |             |
|--|----------------------------|--|-----------------|--|-------------|
|  | Building block             |  | Cycleway        |  | Tree        |
|  | Privacy strip/front garden |  | Shared cycleway |  | Carriageway |
|  | Footpath                   |  | Tree verge      |  | Parking     |
|  | Segregation strip          |  | Street lamp     |  |             |

All measurements in metres

## WELBORNE WAY

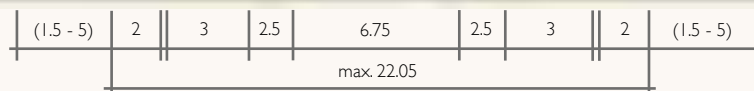


All measurements in metres

Welborne Way is the main north–south route through Welborne. Its characteristics will include:

- a generous carriageway with dedicated cycleways in both directions
- a tree verge and footway on both sides
- taller buildings between three- to five-storeys high fronting onto the road
- a tree verge and footway on both sides with tree and planting proposal compatible with SuDS system. Refer to Strategic Design Code for details.

Welborne Way will connect and pass through a number of the principal centres within the settlement including the Village Centre and District Centre. These are opportunities for 'special' junctions and places that emphasise the urban settings.





### STREET TYPE: WELBORNE WAY

Character	Principal movement route, wider, busier, dedicated cycle facilities, taller buildings.
Design speed	30 mph

### DESIGN ELEMENTS

Desired Radii	6.0m (vehicle tracking to be used)
Trees	In verge
Lighting	✓
Bus route	✓
On-street car parking	None
Traffic calming	Junction spacing, squares, bends, positioning of buildings and trees, activity
Utilities	Under footway
Drainage channels	At edge

### MATERIALS

Materials palette	Typical treatment
-------------------	-------------------



# WELBORNE WAY

## LINK CAPACITY

A VISSIM micro simulation model has been prepared to provide data on the traffic implications within the internal Welborne highway network, specifically Welborne Way.

The coding of the VISSIM model has considered the required street width of Welborne Way of 6.75m. Outputs from the model have confirmed that users of Welborne Way would not experience material delays and free flow of traffic would not be compromised.

Examples of the average speeds of traffic using Welborne Way during peak times have been identified using 'Heat Maps' extracted from the VISSIM model. Yellow sections of the Heat Map indicate average vehicle speeds of 30 mph. Given the absence of significant junctions formed with Welborne Way, the majority of Welborne Way will see average traffic speeds of 30 mph being achieved, confirming that sufficient link capacity will be available.

## FRONTAGE ACTIVITY

There will be frontages along Welborne Way to provide a high-quality urban environment with a strong sense of place. The frontages will provide good passive surveillance and encourage active travel along the length of Welborne Way. Frontages will mostly be residential. However, there will be distinct areas of leisure and commercial units, in areas close to the Village Centre to the north of Welborne Way, and the District Centre to the south. No further new access points will be facilitated from these centres onto Welborne Way. The centres will be serviced either through access points currently proposed on Welborne Way or by the wider street network.

However, there will be minimal direct accesses onto Welborne Way, as this would compromise the traffic capacity and lead to interruptions of the proposed footway and cycleways.

## PARKING RESTRICTIONS

Double yellow lines (Dia 1018.1) will restrict on-street parking along Welborne Way. The gap between the edge of the carriageway and the nearest edge of the longitudinal line shall be approximately 250mm. The lines will be 50mm wide, with a 50mm gap between the lines; they will be painted in No 353 (Deep Cream).



Right: No 353 (Deep Cream)

## JUNCTION LOCATIONS AND DESIGN

The main junction on Welborne Way is at the intersection with Dashwood Avenue.

Other junctions along the route shall be priority junctions with passing bays per CD123 Figure 6.25N2.

See Section 7 for diagrams of typical junctions on Welborne Way.

## MINIMUM CENTRELINE CURVE RADII

The design speed for Welborne Way will be 30 mph/48 kph; the minimum centreline curve radii along Welborne Way will be 41m, as per Table 8.1 of Manual for Streets 2.

## FOOTWAY AND CYCLEWAY DETAILS

To encourage active transport, Welborne Way will have a segregated two-way cycle and pedestrian route on both sides of the carriageway. A 150mm channel block will provide segregation between the pedestrian and cycle routes.



Above: Visualisation of Welborne Way

Segregated routes will be provided in preference to shared space routes as they are safer for visually impaired users and young children; they also provide better facilities for cyclists.

Cycleways will be 3m wide, to accommodate two-way cycle traffic, recumbents and child's trailers.

Footways will be 2m wide to allow buggies or wheelchairs to pass each other.

#### **PUBLIC TRANSPORT PROVISION**

There will be a proposed bus route along Welborne Way. To avoid interrupting traffic flows, bus stops shall be provided in lay-bys. The Bus Rapid Transit (BRT) route will run along Welborne Way. However, no specific BRT infrastructure will be required to facilitate this, as the route provides sufficient traffic capacity and queuing is not expected.

## WELBORNE WAY

### PHASING AND DELIVERY

Welborne Way will be delivered in 2 phases

**Phase 1 - Welborne Way (Knowle Road to Broadway) Works** - the works consisting of the provision of a vehicular link between Knowle Road and Broadway (to include the construction of Welborne Way and the construction of a junction at Knowle Road and the construction of the vehicular link to Broadway) as shown in principle on plan 7328\_104 Rev D and as agreed in accordance with any Highways Agreement;

**Phase 2 - A32/Welborne Way Roundabout Works**  
- the provision of a permanent vehicular roundabout

access onto the A32 as shown in principle on the plan 6091/GA/311 Rev G including the shared use route extension on the southern arm to the "A32 / Knowle Road / Chalk Lane Roundabout Works and as agreed in accordance with any Highways Agreement.

It is important that these junctions are delivered in a timely manner as their main purpose is to alleviate congestion and delays on the A32. Although the transport assessment demonstrated the Welborne Way is only required prior to the occupation of 1,851 units and the roundabout by 2,601 units Buckland, as master developer, will monitor the capacity of Knowle Road and Broadway Roundabout annually from the

Phase 1 - Welborne Way (Knowle Road to Broadway) Works



occupation of 1,160 units. In the event that the RFC values exceed 0.75 on any one arm of the Knowle Road and Broadway Roundabouts, WLL will complete the construction of Welborne Way between Broadway Roundabout to the south and Knowle Road to the north within 12 months. If the RFC values do not exceed 0.75 Buckland will complete the road prior to

- Occupation of 1851 Residential Units within Area X; or
- Occupation of any Residential Unit or Commercial Unit within Area Y; or
- More than 25% Occupation of any land use with the Employment Area;

Once Welborne Way is open to traffic Buckland will continue to monitor Knowle Road and Broadway Roundabout, in the event the RFC values exceed 0.75 on any one arm of the Knowle Road and Broadway Roundabouts, WLL will commence the construction of Welborne Way Roundabout within 6 months. In order to safeguard the earlier delivery of the roundabout, if required, Buckland will submit a S278 preliminary design check prior to the occupation of the 700th units. If the RFC values do not exceed 0.75 Welborne Way Roundabout will be complete prior to the occupation of 2,601st unit

Phase 2 - A32/Welborne Way Roundabout Works

