T2 C11a

Come home to HOULTON

KEY PHASE 4

Tier 2: Application to Discharge
Outline Condition 11a

Design Guide

This Design Guide has been prepared in response to Condition 11 of the Houlton Outline Planning Permission (application reference R17/0022).

This Design Guide is to be read with reference to the Houlton Outline Planning Permissions (R11/0699 and R17/0022) and the respective DAS and DAS Addendum.

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Fig 0.1: The high quality of design including landscape, streets, community facilities and development being implemented in Key Phase 1 sets a standard for Key Phase 3 to follow.

PREFACE

Outline planning permission for a sustainable urban extension (SUE) at Radio Station Rugby, now known as Houlton, was granted by Rugby Borough Council in May 2014 (ref: R11/0699) and a S.73 application was approved for the site in June 2017 (ref: R17/0022). The SUE comprises 6,200 dwellings together with up to 12,000 m² retail (A1), up to 3,500 m² financial services (A2) and restaurants (A3-A5), up to 3,500 m² for a hotel (C1), up to 2,900 m² of community uses (D1), up to 3,100 m² assembly and leisure uses (D2), 31 hectares (up to 106,000sqm of commercial and employment space (B1, B2 and B8).

Due to the strategic nature of the SUE and the scale and complexity of the development, the site will be developed in a series of 'Key Phases'. This will ensure that implementation can respond to market demand and the practicalities of development. The conditions attached to the outline planning permission require a three tiered approvals process to control the design and delivery of the development from outline to Key Phase, to detailed site level. This approach is set out below.

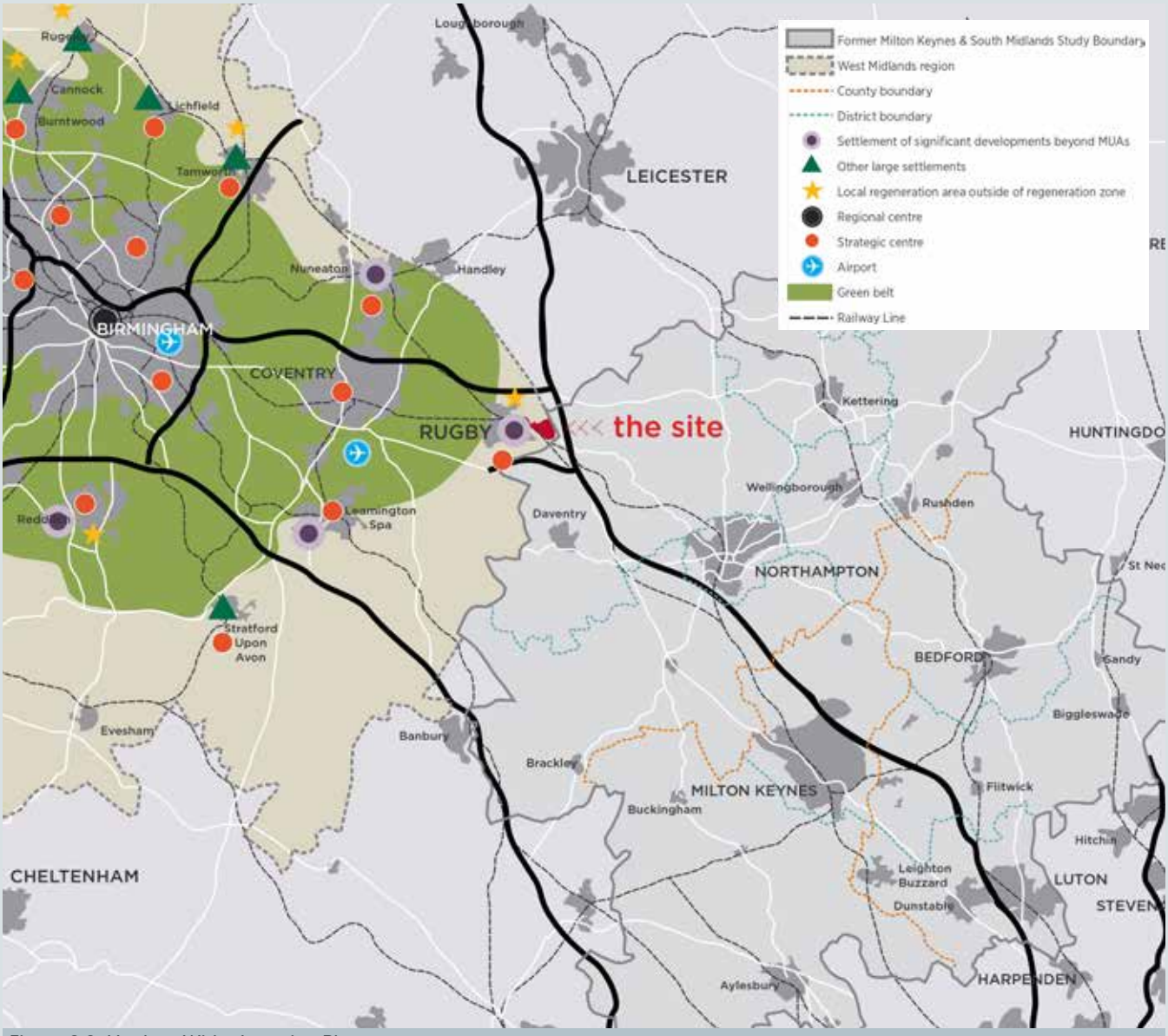


Figure 0.2: Houlton Wider Location Plan

Figure 0.3: Illustrative Masterplan

Figure 0.4: Houlton Illustrative Masterplan

THE HOULTON VISION

As one of the largest and most centrally located sustainable urban extensions in England, Houlton is now a vibrant and growing new community within Rugby. Set amongst a network of extensive and rich green spaces and corridors, playgrounds, community facilities, schools, cycle routes and footpaths, will be over 6,000 high quality homes. Formerly the longwave transmission centre for the UK, connecting us with the rest of the world, Houlton is a place with a rich history and an exciting future.

Urban&Civic and Aviva Investors are delivering Houlton in partnership, as Master Developer, working closely with local and national stakeholders, housebuilder customers and the community in and around Houlton. This collaborative approach is ensuring a clear focus on quality, nature and placemaking, the acceleration of infrastructure and real community spirit.

Houlton has exceptionally strong connections both throughout the site via a network of footpaths, cycleways and principal roads which directly link into Rugby and its West Coast main line station and the M1 to the east. For local nature, Houlton also provides an extensive network of wildlife corridors which create enhanced habitats for protected species and connections between significant areas of green space around the site.

Healthy lifestyles, sustainable development, enhanced biodiversity and beauty have always been watchwords for Houlton which residents are able to enjoy immediately from their doorsteps. Local centres provide facilities such as the Tuning Fork café, a convenience store and nursery.

With three primary schools and one secondary school, Houlton will set the benchmark for integrated education provision. The secondary school incorporates the Grade 2 listed C-Station building forming a new landmark for Houlton and for Rugby as a whole. The conversion of this building and retention of other elements of the site's history such as the radio mast bases, embeds Houlton in its illustrious past and provides the foundations for its exemplar future.

This vision that we've had for Houlton is already becoming a reality and we look forward to working with likeminded individuals and companies who want to be part of building a Houlton of which we can all be proud.

PART A

Context

Chapter 1
Introduction

1.1 PLANNING CONTEXT

Tier 1: Outline & Site Wide Planning

The outline planning permission approved the broad quantum and disposition of land uses as defined by the Development Specification, Parameter Plans and the general design principles within the Design and Access Statement. Submission and approval of a set of site wide strategies in relation to specific topics is required by outline condition 6, prior to the commencement of development or approval of any Reserved Matters applications. The site wide strategies will supplement the parameters set by the outline permission.

Tier 2: Key Phase Planning

Outline conditions 9, 11 and 12 require approval of detailed documentation to agree the definition of and provide a framework for each Key Phase. At this tier, a greater level of detail is provided specific to that Key Phase with the required technical information to inform and provide a base against which Reserved Matters applications within the Key Phase area can be assessed:

- Condition 9: Key Phase Definition Statement – to define and justify the extent of that Key Phase.
- Condition 11: Key Phase Framework – following the definition of each Key Phase, a Framework including a Design Guide / Code, Delivery Plan and other Key Phase specific documents including any relevant supplements to the Tier 1 site wide strategies, that establish the design and delivery framework for that Key Phase, will be submitted for approval. These documents ensure that the Council can exert control over subsequent Reserved Matters applications and the implementation of development in that Key Phase.
- Condition 12: Key Phase Technical Requirements – detailed assessments for that Key Phase relating to specific technical issues such as heritage, ground conditions and ecology.

Tier 3: Reserved Matters Planning

Once a Key Phase has been fully approved, including the relevant Framework documents relating to Tier 2, Reserved Matters applications can be approved for individual parcels or infrastructure within that Key Phase. These Reserved Matters applications will provide a further level of detailed design in accordance with the Framework for that Key Phase, including the Design Guide and the requirements of outline condition 15 (Reserved Matters applications).

This Submission

KP4 – Scope, Definition and Framework

SUE GP LLP are now seeking to facilitate a start on site on KP4 through the submission of the necessary material to allow the Key Phase to progress and the first elements of infrastructure to be implemented. This requires the approval of a series of documentation in accordance with the tiered approach outlined above. Details are being prepared to be submitted to RBC for approval to facilitate the commencement of KP4, as follows:

1.2 THE TIERED APPROACH

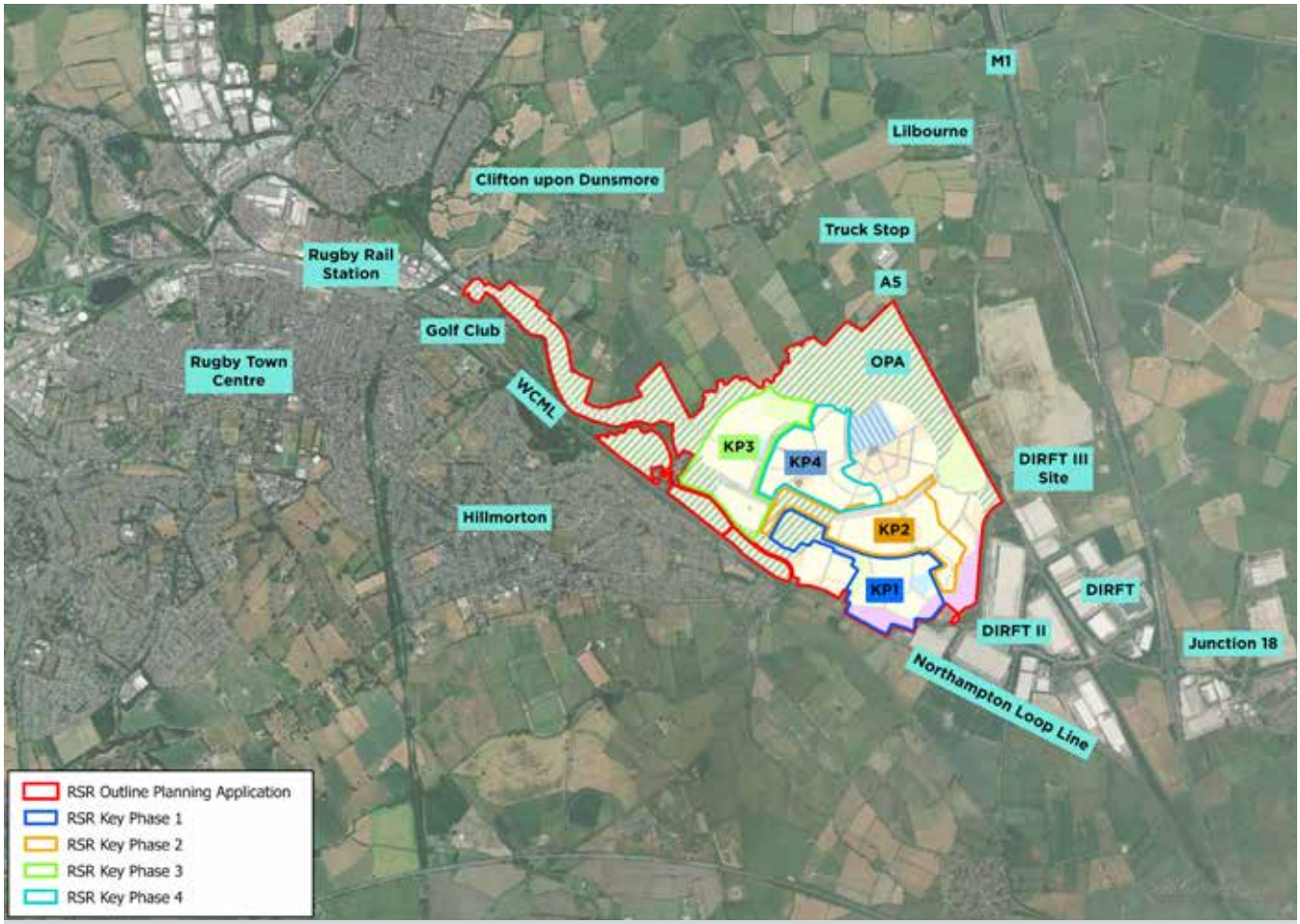


Figure 1.1: Development Framework Plan for Houlton with KP4 in context with other Key Phases

Tier 1 - Outline

Condition 6 Site Wide Strategies have been submitted and approved by RBC in June 2014.

Tier 2 - Key Phase

1. Condition 9 KP4 Definition
   - KP4 Definition Statement
     (The extent of KP4 in relation to the SUE is illustrated in Figure 1.1.)

2. Conditions 11 and 12 - KP4 Framework and Technical Requirements
   - 11a) KP4 Design Guide
   - 11b) KP4 Delivery Plan
   - 11d) S.106 Update Statement
   - 11e) KP4 Code of Construction Practice Part B
   - 12a) KP4 Heritage Statement and Mitigation Strategy
   - 12b) KP4 Ecological Mitigation and Enhancement Strategy
   - 12c) KP4 Foul and Surface Water Drainage Strategy
   - 12d) KP4 Site Investigation of Ground Conditions

Tier 3 – Reserved Matters

A Reserved Matters application, together with full supporting technical information relevant to the Reserved Matters area, in accordance with outline conditions 14 and 15, will deliver the remaining strategic infrastructure for KP4.

This KP4 Design Guide forms part of the Tier 2 application to discharge in part outline condition 11a) – KP4 Framework.

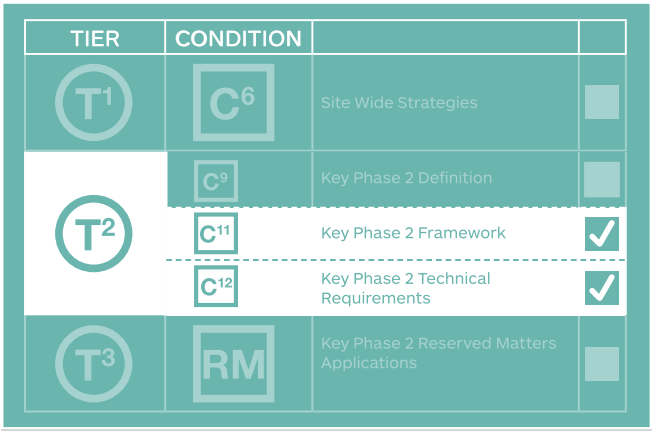


Figure 1.2: Diagram Illustrating where the Design Guide site within the tiers of the Key Phase approach

1.3 DEVELOPMENT FRAMEWORK PLAN & PARAMETER PLANS

Outline Planning Application

Condition 5 of the outline permission identifies all of the formally approved plans and documents including the Development Framework Plan, Parameter Plans, the Development Specification and the design principles contained within the Design and Access Statement (DAS) and DAS Addendum (2017). Together these provide the development framework for the site. Under Condition 5, the development must be substantially in accordance with this framework.

Figure 1.3: OPA DFP Parameter Plan with OPA and KP4 Boundaries

Outline Planning Application Development Framework Plan and Parameter Plans

The DFP sets a framework for future development land uses within the Houlton site. An inset plan of the OPA DFP is presented in Figure 1.3. Within KP4 (see Fig 1.4) these land uses include residential of up to 1,480 dwellings can be accommodated within K43, distributed within residential areas.

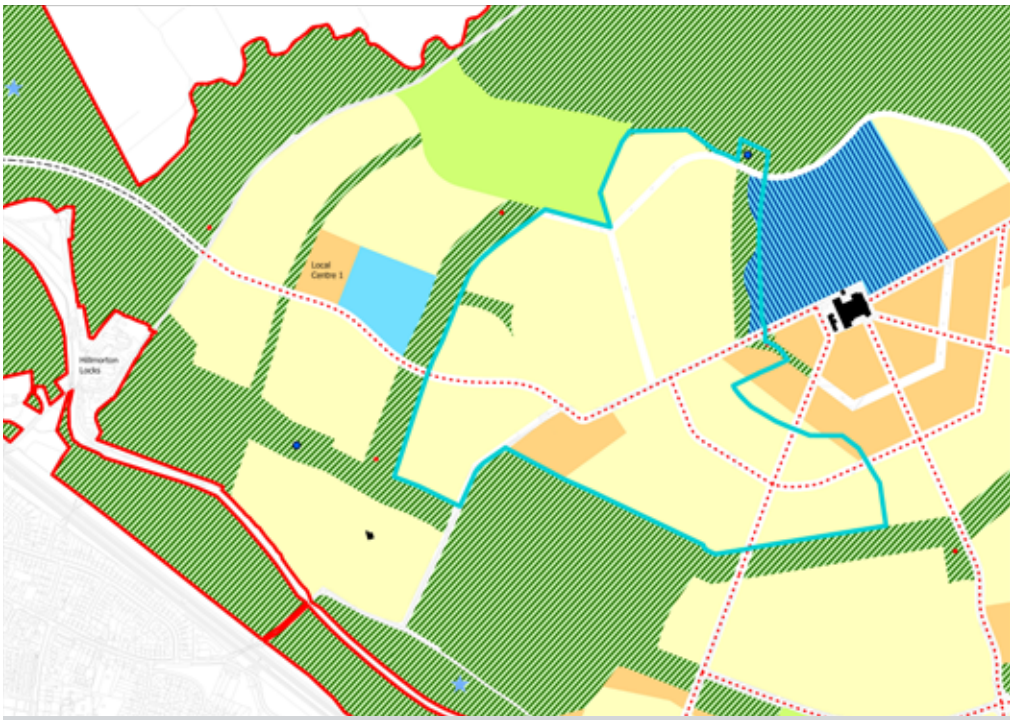


Figure 1.4: KP4 area context: OPA DFP Parameter Plan with OPA and KP4 Boundaries

Access and Movement Parameter Plan

The extent of KP4 is illustrated in the context of the Access and Movement Parameter Plan in Figures 1.5 and 1.6.

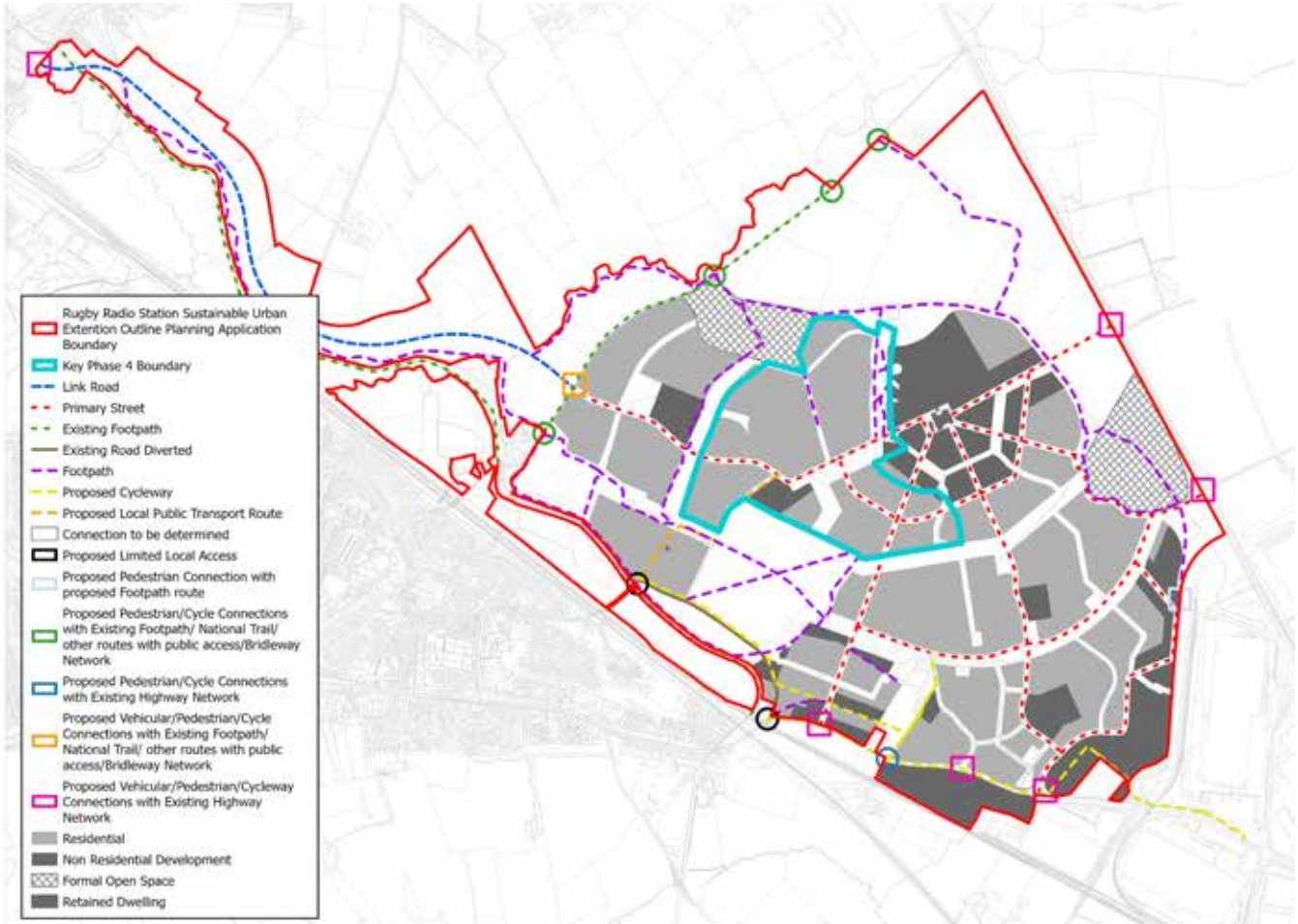


Figure 1.5: OPA Access and Movement Parameter Plan with OPA and KP4 Boundaries

KP4 will continue the internal road structure established in KP1, KP2 and KP3, and its reserved matters applications for 'grey infrastructure'. The movement structure is provided via the Central Primary Street (CPS) which runs east west through KP4 and connects to the approved Link Road to the west side of KP3. Secondary and tertiary streets will flow from the CPS serving the development parcels and provide for a hierarchical street network. The CPS will connect to KP3, C Station and District Centre.

Figure 1.6 KP4 area context: OPA Access and Movement Parameter Plan with OPA and KP4 Boundaries

Green Infrastructure Parameter Plan

The Green Infrastructure parameter plan (with OPA and KP4 boundaries for context) is illustrated in Fig 1.7 and 1.8.

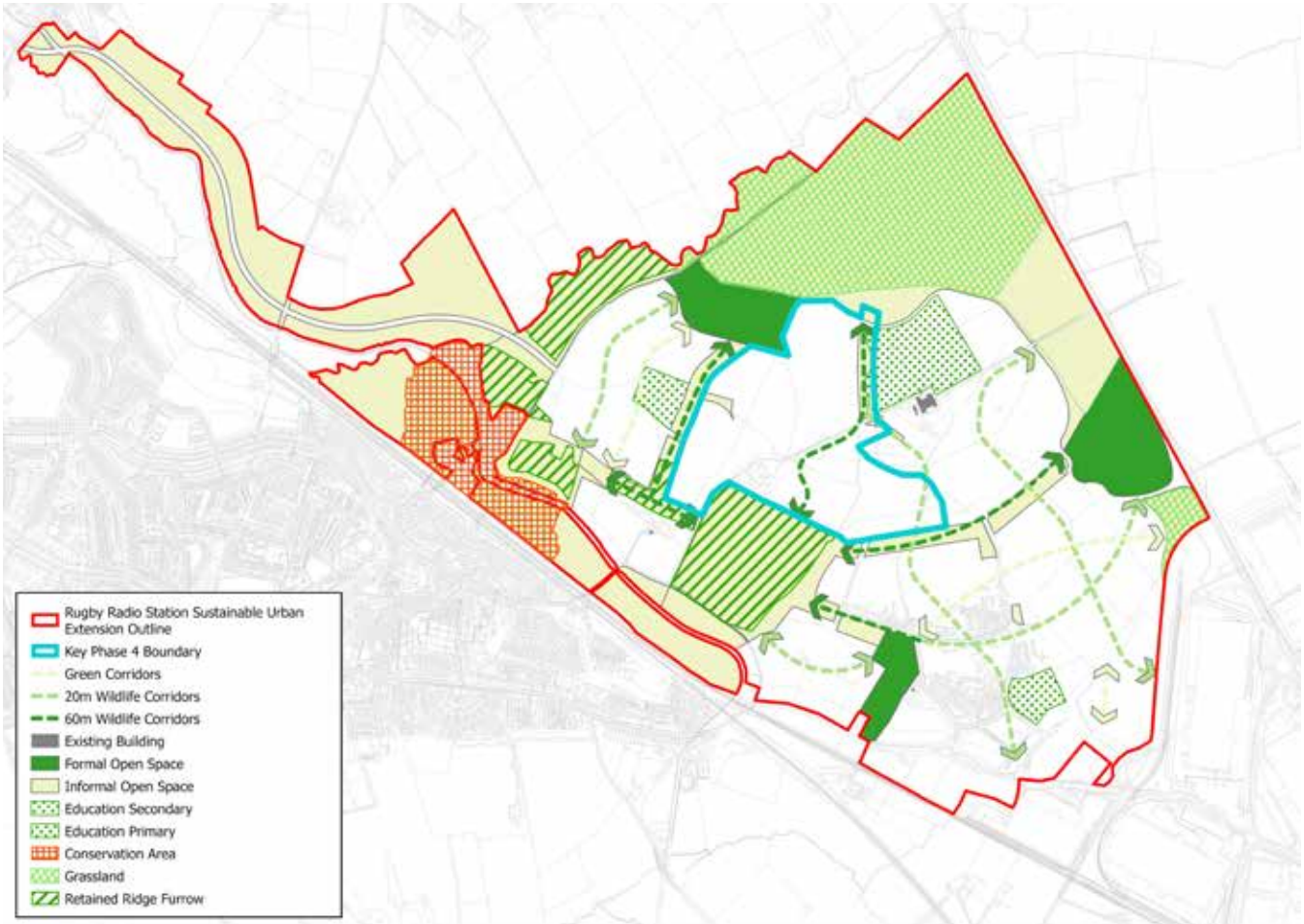


Figure 1.7: OPA Green Infrastructure Parameter Plan with OPA and KP4 Boundaries

KP4 accommodates a range of green infrastructure components identified on the Parameter Plan, including:

- Wildlife corridors: noted by the large, dotted line arrows on the Parameter Plan these corridors sweep across the site creating an interconnected network of wildlife corridors. There are two scales of wildlife corridor: 60m and 20m wide.
- Smaller blocks of informal open space to be distributed throughout KP4.
- Access routes to formal open spaces in adjacent Key Phases KP2, KP3 and the District Centre including formal Play Area provision, Formal Parks, Sports Pitches and facilities that will be publicly accessible at the Secondary School outside teaching hours (see principles and guidance for Access to Formal Spaces in Chapter 3).

Figure 1.8: KP4 area context: OPA Green Infrastructure Parameter Plan with OPA and KP4 Boundaries

Housing Density Parameter Plan

The outline planning application parameter plans include housing density, as illustrated in Figures 1.9 and 1.10.

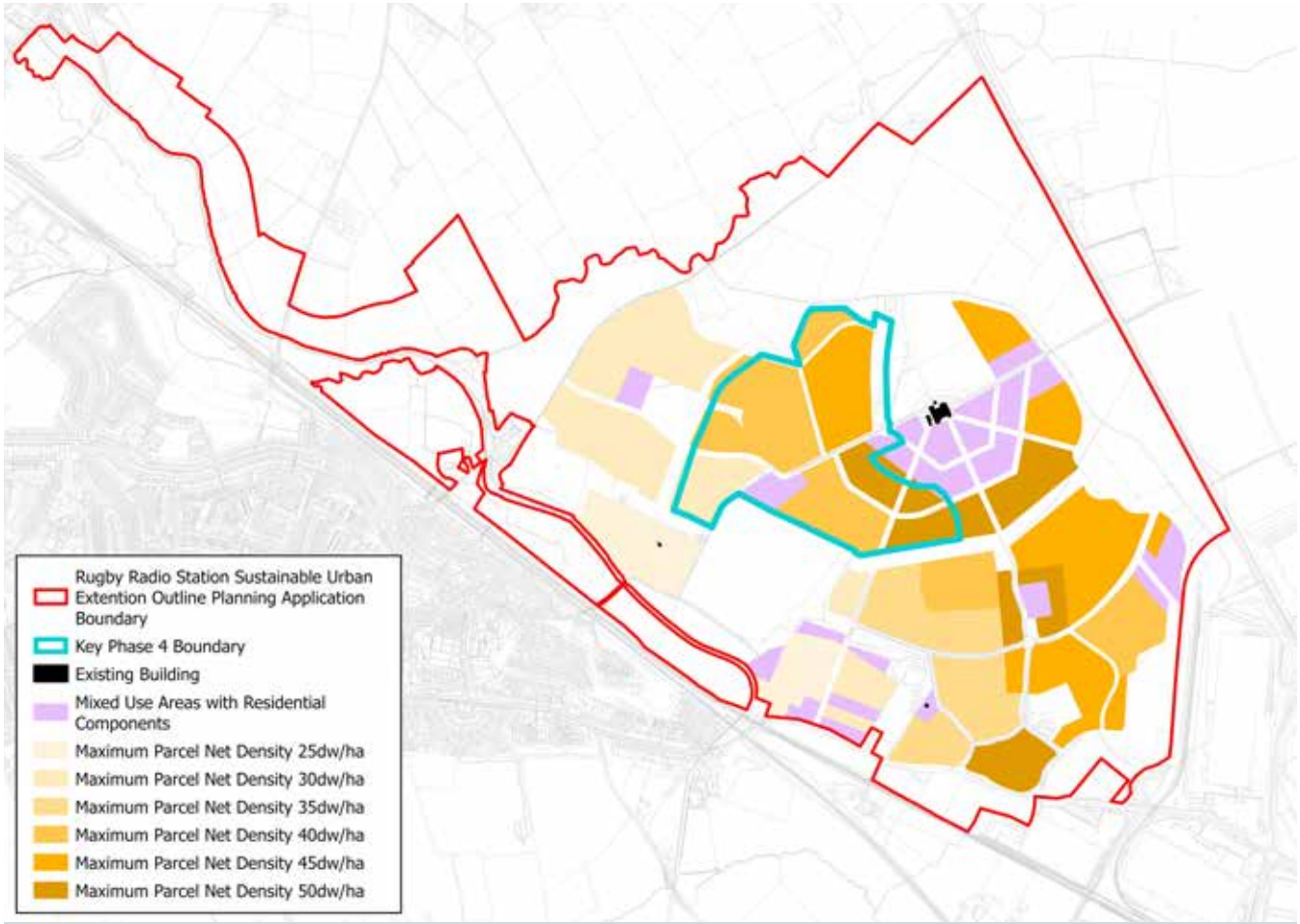


Figure 1.9: OPA Housing Density Parameter Plan with OPA and KP4 Boundaries

These considerations are illustrated on the above plans - extracts and key considerations include:

- Opportunity to integrate a range of residential densities across the site;
- Areas of higher density associated with the interface of KP4 with higher density residential development that will define the edges of the District Centre.

Figure 1.10: KP4 area context: OPA Housing Density Parameter Plan with OPA and KP4 Boundaries

Building Heights Parameter Plan

Extracts of the building heights parameter plan are presented in Figures 1.11 and 1.12.

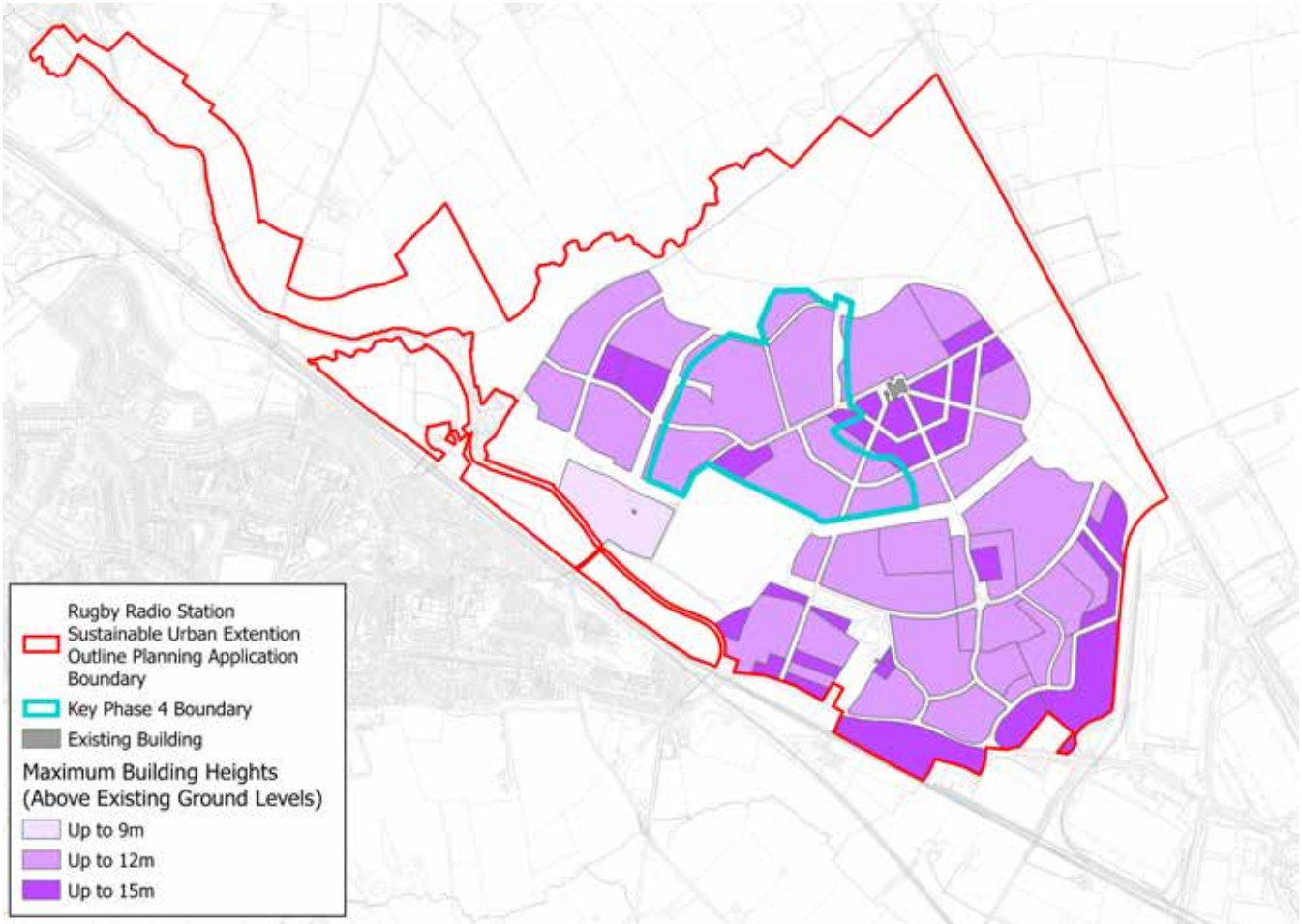


Figure 1.11: OPA Building Heights Parameter Plan with OPA and KP4 Boundaries

Considerations include:

- Buildings heights within KP4 are predominately to be up to a maximum of 12m;
- Some opportunities for building heights of up to 15m in certain areas;
- The limits for building heights are based upon:
  - measurements above existing ground;
  - all heights are specified to ridge level but exclude any point features, e.g. spires.

Figure 1.12: KP4 area context: OPA Building Heights Parameter Plan with OPA and KP4 Boundaries

1.4 OVERVIEW OF THE DESIGN GUIDE CONTENTS

The Design Guide has been structured as follows:

Part A: Context sets out the Context and purpose of the Guide alongside the Context and features of KP4 and the Vision, Objectives and how the Design Guide meets the Key Principles for Houlton.

Part B: Open Space & Movement, presents design guidance relating to:

- Landscape & Public Realm Design, setting out design requirements for green infrastructure, types of open spaces alongside public realm palettes and landscape treatments;
- Movement & Access, setting out design requirements for walking, cycling, public transport and wider vehicular movement, with a street hierarchy, types of streets and spaces and vehicle and cycle parking.

Part C: Spatial, presents design guidance relating to:

- Built Form, including key architectural and urban design principles, key groupings, character, and detailed design requirements for building alongside those for parking, boundary treatments, waste management and drainage.

Appendices: Associated important KP4 information is set out in a set of appendices including indicative sequencing and a sustainability statement that sets out sustainability targets for KP4 in terms of energy, waste and water.

PART A: CONTEXT	
Explains and appraises the context of the KP4	
Chapter 1	Introduction
Chapter 2	KP4 Context & Vision
PART B: OPEN SPACE & MOVEMENT	
Establishes a comprehensive framework for development	
Chapter 3	Landscape & Public Realm Design
Chapter 4	Movement & Access
PART C: SPATIAL	
Identifies the characteristics of the residential built form.	
Chapter 5	Residential Built Form
APPENDICES	
Appendix 1: KP4 Regulatory Plan	
Appendix 2: KP4 Compliance Checklist	
Appendix 3: Validation Lists	
Appendix 4: Indicative KP4 Phasing	
Appendix 5: Glossary	

Figure 1.13: Overview of KP4 Design Guide Structure

Purpose of the Design Guide

The purpose of this Design Guide is to provide design guidance and mandatory fixes for the development of KP4 of Radio Station Rugby against which subsequent Reserved Matters Applications within that phase will be considered.

It has been prepared to ensure that the highest standard of design is delivered when preparing and considering Reserved Matters applications that are submitted pursuant to the KP4 of the OPP for the site.

In so doing, the Design Guide carries forward the design ethos as set out in the Outline Planning Design and Access Statement, translating this into the second Key Phase of the development.

Status of the Design Guide

The Design Guide has been prepared to part discharge condition 11a of the OPA Permission for Houlton insofar as it relates to KP4. As such, the Design Guide is broadly consistent with, and provides an enhanced level of detail to the approved Tier 1 documents for the wider site, namely the updated Parameter Plans, Development Specification, the Design & Access Statement Addendum and Supplementary Environmental Impact Assessment and should therefore be read in conjunction with these documents.

Relative to design guides prepared for KP1, KP2 and KP3, this Design Guide has an amended structure, reflecting on reviews of the previous guides in how the principles have been interpreted and applied both in the design of development and their assessment. The new structure proposed in the KP4 Design Guide aims to be simpler and easier to use, with an amended structure which addresses the master planning and built form principles slightly differently.

The Design Guide is specific to KP4. However, it draws upon national and local policies and best practice urban design guidance including: The National Planning Policy Framework; Planning Practice Guidance, including the National Design Guide; Manual for Streets 1 & 2; and Building for Life 12.

The Design Guide also considers and responds to Policies set out in the Rugby Borough Local Plan 2011-2031 and local design guidance including the Sustainable Design & Construction SPD (RBC, LDF, 2012). The Design Guide has been approved by RBC and is a material consideration in the determination of applications in KP4.

1.5 HOW TO READ THE DESIGN GUIDE

Design Fixes & Design Guidance

The Design Guide includes:

- Mandatory design fixes – elements within the Design Guide that must be adhered to
- Text Overview...
- Supporting design guidance – illustrative content that shows how development may be configured to comply with mandatory design fixes.

Figure 1.14 provides an example of the relationship between the design fixes and design guidance and illustrates how they are identified.

How design fixes are identified in summary lists at the start of chapters

Further detail regarding design fixes and supporting design guidance is then provided within the chapter, with fixes identified in boxes with coloured outlines.

Design Fix headlines from all chapters are listed together in the Compliance Checklist provided in Appendix 2, see Section 1.9 for further detail on the purpose of the checklist.

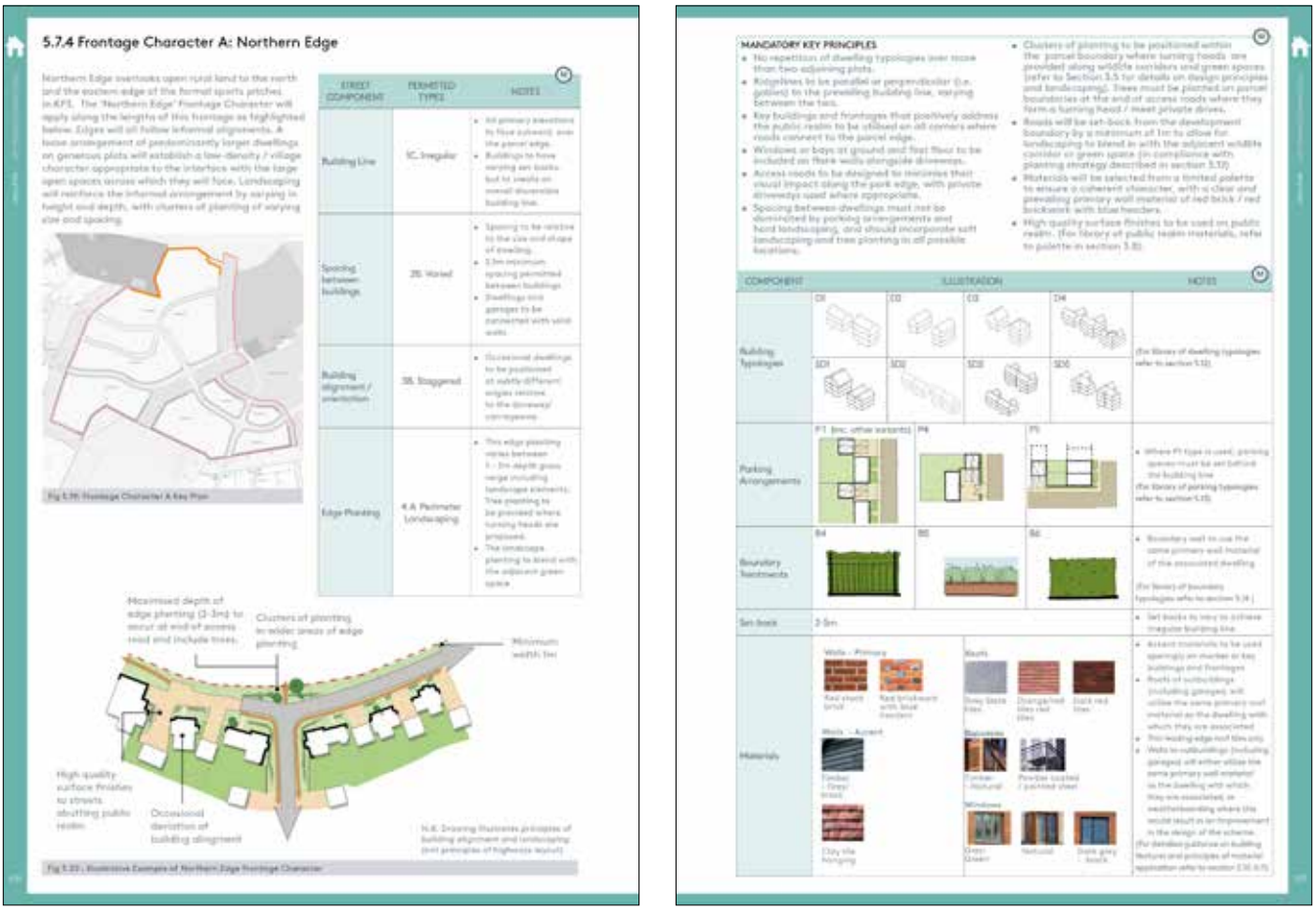


Figure 1.14 Relationship between design fixes and design guidance

How to Read the Design Guide

The Regulatory Plan forms the overriding design control tool and informs the structure of the Design Guide.

The Design Guide document must be read alongside the accompanying Regulatory Plan. The following pages explain how the reader should use the Design Guide and Regulatory Plan.

Figure 1.15: Design Guide Structure, gives an overview of the relationship between the Regulatory Plan and Design Guide document. The Regulatory Plan is the most important Design Guide plan and its content is explained in more detail in chapters within the document that relate to the plan's key. Chapters within Part B & C of the document expand upon the spatial framework for development, covered under the five topic areas listed.

Figure 1.16 on the following page presents a flow chart diagram of 'How to Use the Design Guide', showing how the chapters build up, explaining layers of Regulatory Plan and associated material.

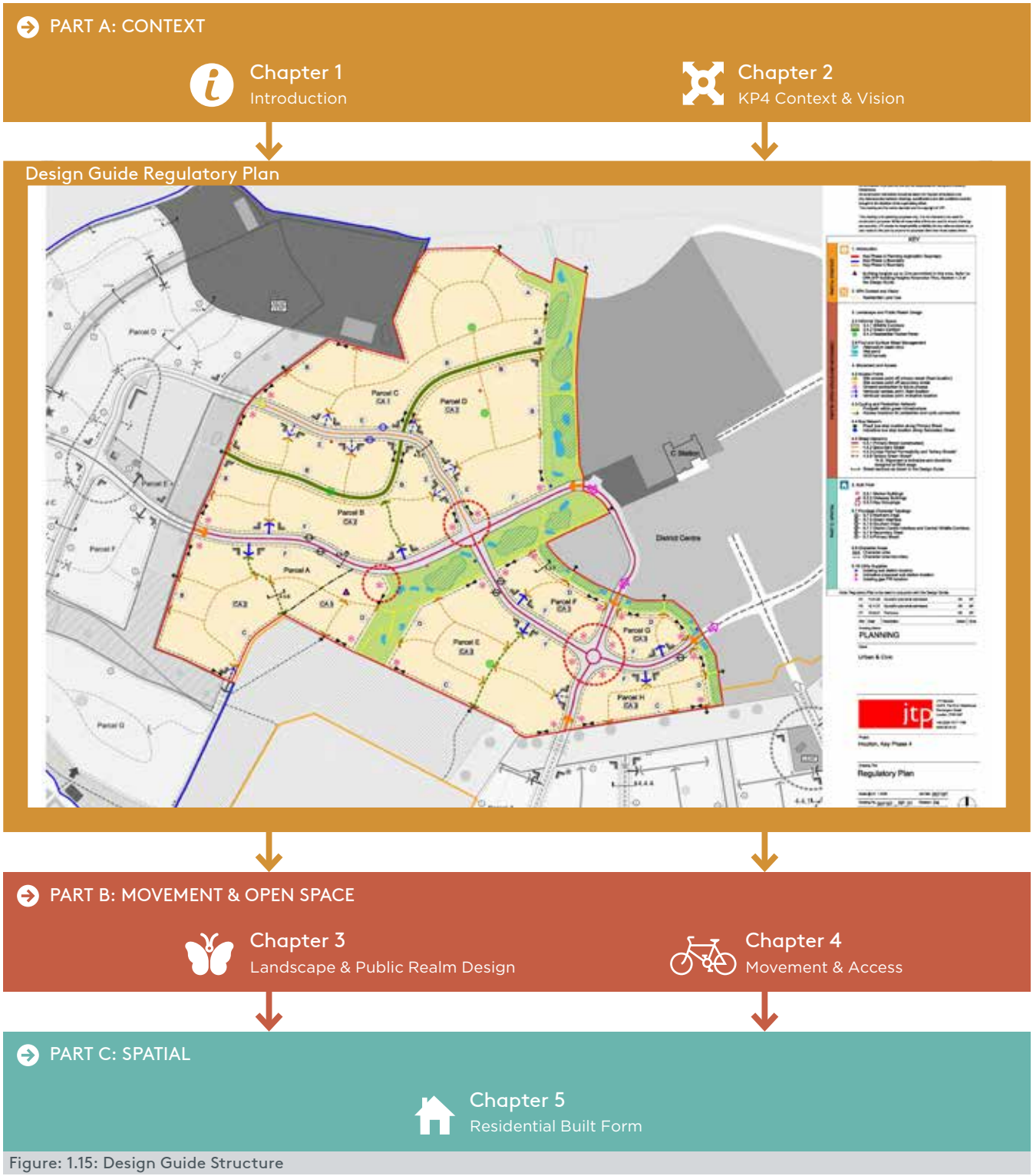


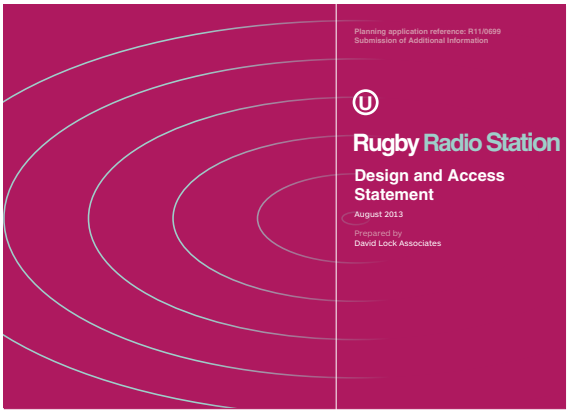
Figure: 1.15: Design Guide Structure

1.6 USING THE DESIGN GUIDE

The Design & Access Statement (DAS) for the OPP and DAS Addendum for the S.73 set the overall design context for the wider scheme. The Design Guide for KP4 should be read alongside the DAS and its addendum.

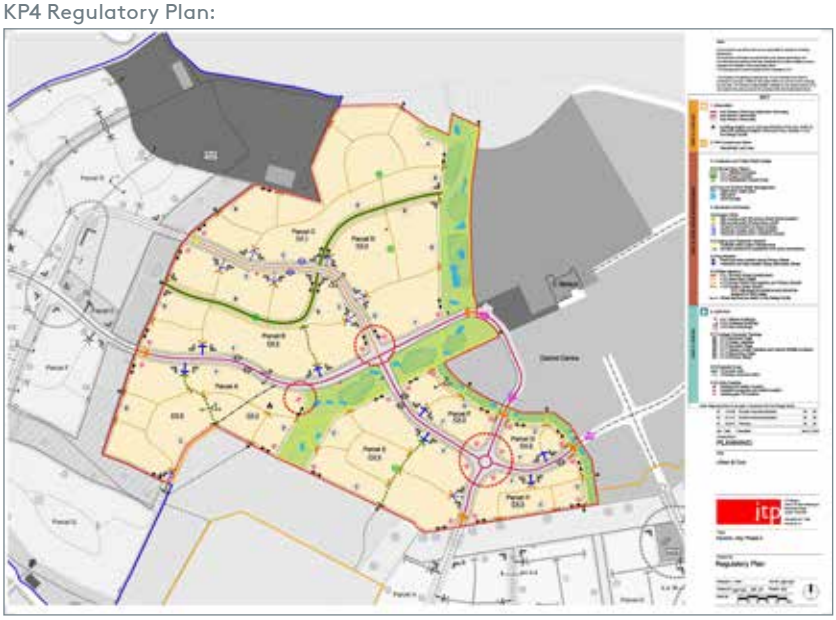
The main principles contained within the DAS, together with the OPA Parameter Plans, provide the framework for the Design Guide and Regulatory Plan.

OPA DAS:



KP4 Design Guide:

KP4 Regulatory Plan:



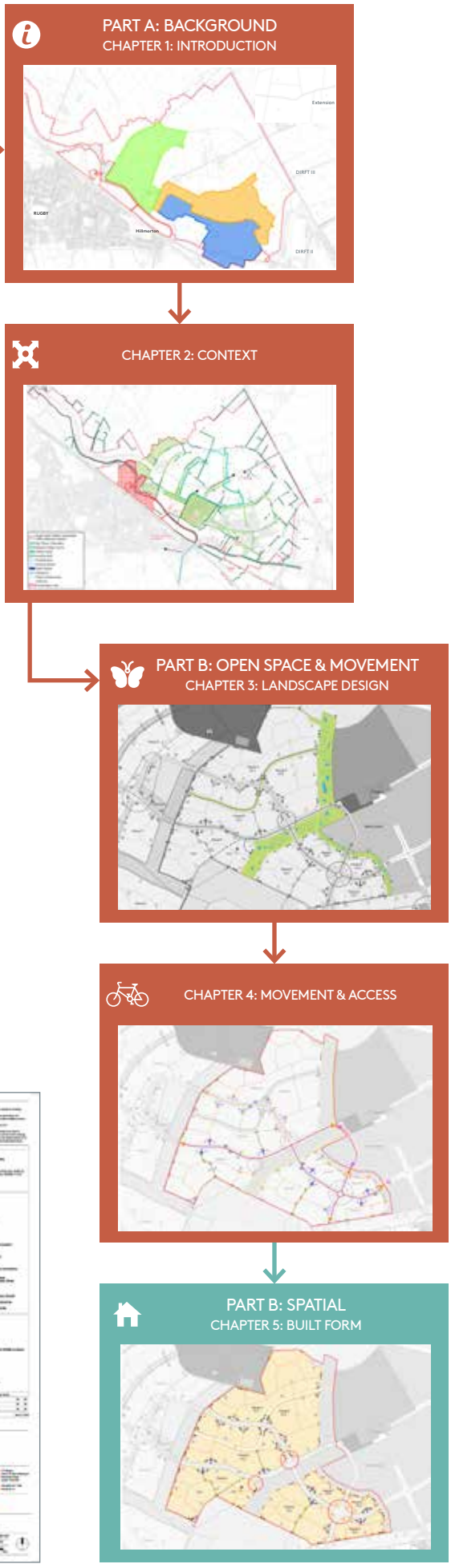


Figure 1.16: How to use the Design Guide

1.7 THE REGULATORY PLAN

The Regulatory Plan provides the main design control tool. It sets the framework for development within KP4.

The Regulatory Plan is informed by the Development Framework Plan from the Outline Planning Application, demonstrating broad compliance with its parameters. The Regulatory Plan defines key design structuring elements which are expanded upon in chapters of the Design Guide. The Regulatory Plan sets out the overall development concept and establishes the key parameters and mandatory elements of the design of KP4 for specific parcels within that phase.

Regulatory Plan Fixes

The regulatory plan sets out design fixes for the development of KP4 including:

- Landscaping and green infrastructure;
- Street network; and
- Individual development parcels that are positioned within the network of landscaping and streets.

Whilst the Regulatory plan sets out an overall framework for development it is acknowledged that a degree of flexibility will be required in the design of detailed proposals, for example:

- Although street corridors are fixed in scale, the detail design of streets will need to be explored in greater detail in parallel to the consideration of the access requirements for adjacent parcels.
- Likewise, whilst the location of landscaping and green infrastructure is fixed, the exact design of these spaces, including their boundaries, is subject to detail design that will need to be considered in line with adjacent development parcels and streets.

Regulatory Plan Key

The key to the Regulatory Plan precisely cross references to chapters in Parts B & C of the Design Guide, comprising:

- Landscape Design;
- Movement & Access; and
- Built Form.

Technical Details

The Regulatory Plan also illustrates points of more technical detail that are expanded upon further within the Landscape Design chapter of the Guide. These items include ecology issues such as ponds, locations for play areas, utilities including indicative locations for substations, and surface water drainage.

Parcel References

The Regulatory Plan includes parcel references for development parcels. These letters are not cross referenced in the Design Guide but are provided for ease of reference for future Reserved Matters applications. These parcel references, in allowing parcels to be identified, do not represent a phasing sequence.

The structure of the Guide follows the structure of the Regulatory Plan key; therefore the Regulatory Plan must be read in conjunction with the Design Guide.

Further Regulatory Plan reference:

- An extract of the Regulatory Plan is presented in Figure 1.17 on the next page, next to an enlarged key in Figure: 1.18.
- For a full scale print version of the Regulatory Plan please refer to Appendix 1.

THE REGULATORY PLAN

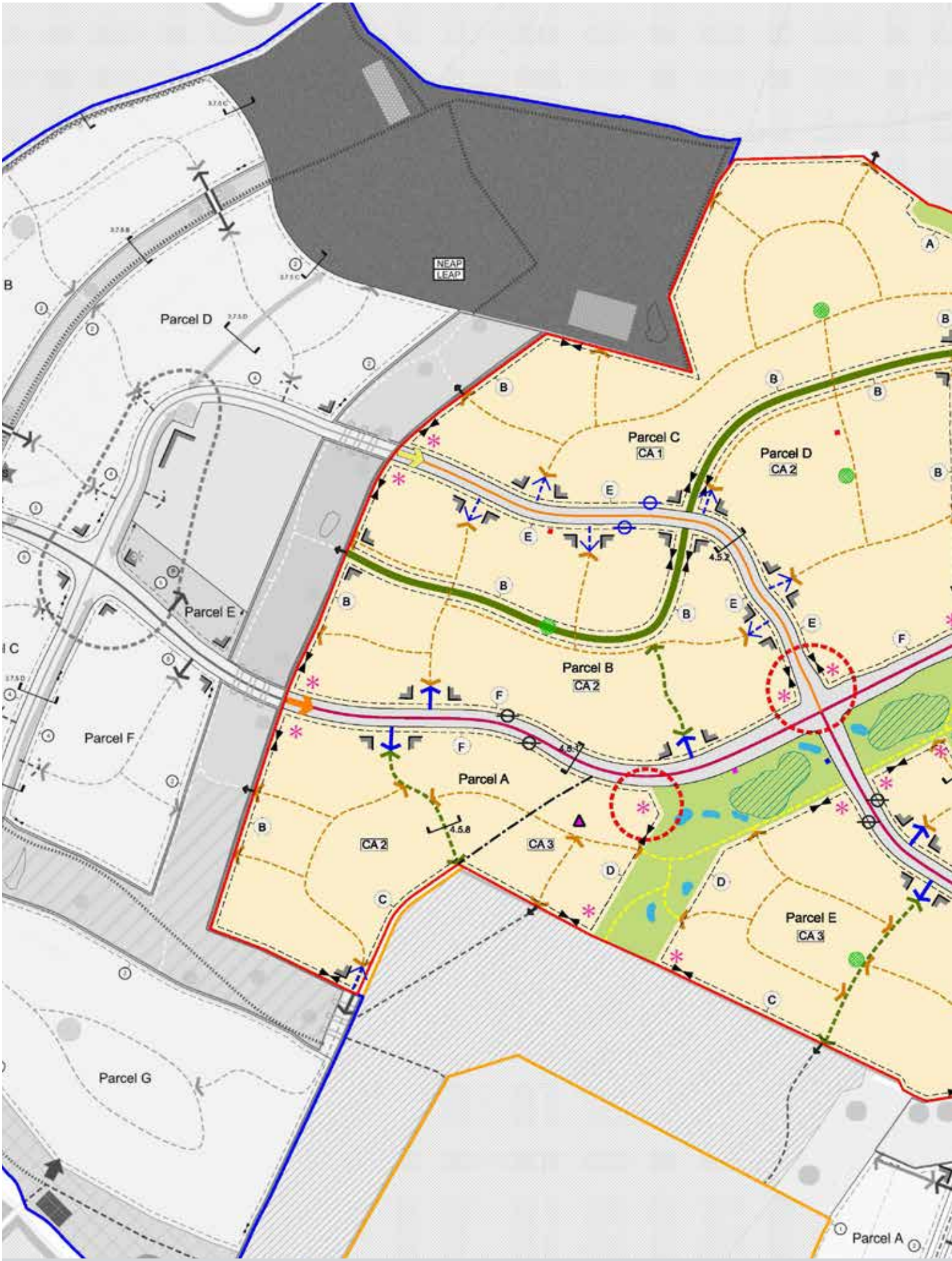
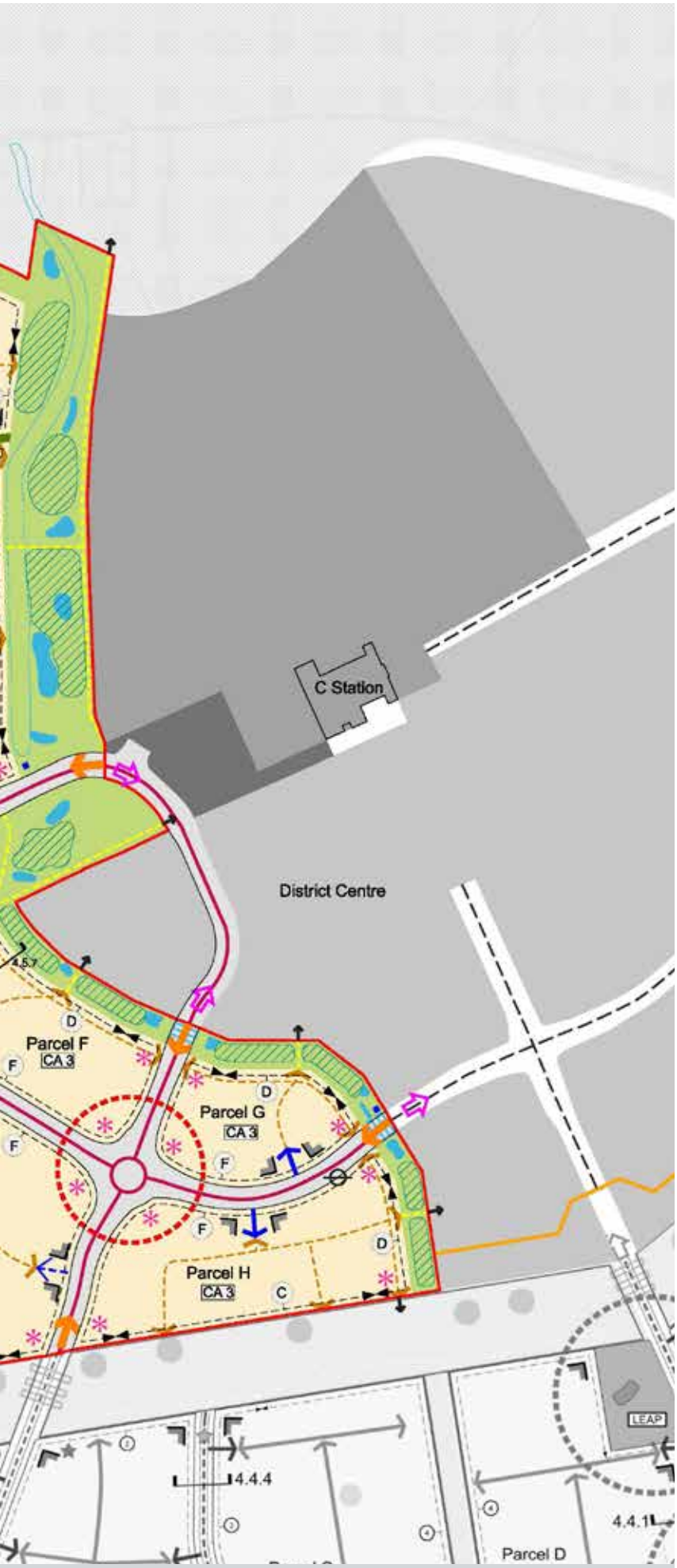


Figure 1.17: Regulatory Plan



1. Introduction

Key Phase 4 Planning Application Boundary
Key Phase 3 Boundary
Key Phase 2 Boundary

Building heights up to 15m permitted in this area. Refer to OPA DFP Building Heights Parameter Plan, Section 1.3 of the Design Guide.

2. KP4 Context and Vision

Residential Land Use

3. Landscape and Public Realm Design

3.4 Informal Open Space
3.4.1 Wildlife Corridors
3.4.2 Green Corridor
3.4.3 Residential Pocket Parks

3.6 Foul and Surface Water Management:
Attenuation basin (dry)
Wet pond
GCN tunnels

4. Movement and Access

4.2 Access Points
Site access point off primary street (fixed location)
Site access point off secondary street
Onward connection to future phases
Vehicular access point: fixed location
Vehicular access point: indicative location

4.3 Cycling and Pedestrian Network
Footpath within green infrastructure
Access locations for pedestrian and cycle connections

4.4 Bus Network
Fixed bus stop location along Primary Street
Indicative bus stop location along Secondary Street

4.5 Street Hierarchy
4.5.1 Primary Street (constructed)
4.5.2 Secondary Street
4.5.3 Cross Parcel Permeability and Tertiary Streets*
4.5.8 Tertiary Green Street*
*N.B. Alignment is indicative and should be designed at RMA stage
Street sections as drawn in the Design Guide

3. Built From

5.5.1 Marker Buildings
5.5.2 Gateway Buildings
5.5.3 Key Groupings

5.7 Frontage Character Typology
(A)– 5.7.4 Northern Edge
(B)– 5.7.5 Green Interface
(C)– 5.7.6 Southern Edge
(D)– 5.7.7 District Centre Interface and Central Wildlife Corridors
(E)– 5.7.8 Secondary Steet
(F)– 5.7.9 Primary Street

5.9 Character Areas
CA X Character area
Character area boundary

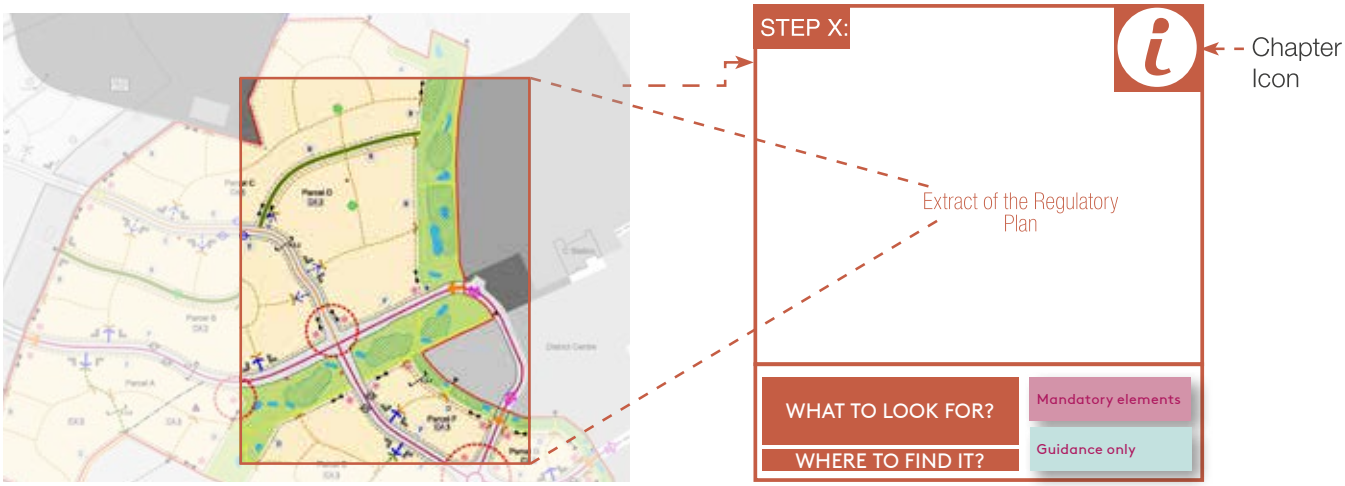
5.18 Utility Supplies
Existing sub station location
Indicative proposed sub station location
Existing gas PRI location

Note: Regulatory Plan to be read in conjuction with the Design Guide.

Figure 1.18: Enlarged Regulatory Plan key

1.8 HOW TO USE THE REGULATORY PLAN

The diagram in Figure 1.19 provides a series of steps which explain the process through which development parcels are to be designed using the Regulatory Plan and the Design Guide.



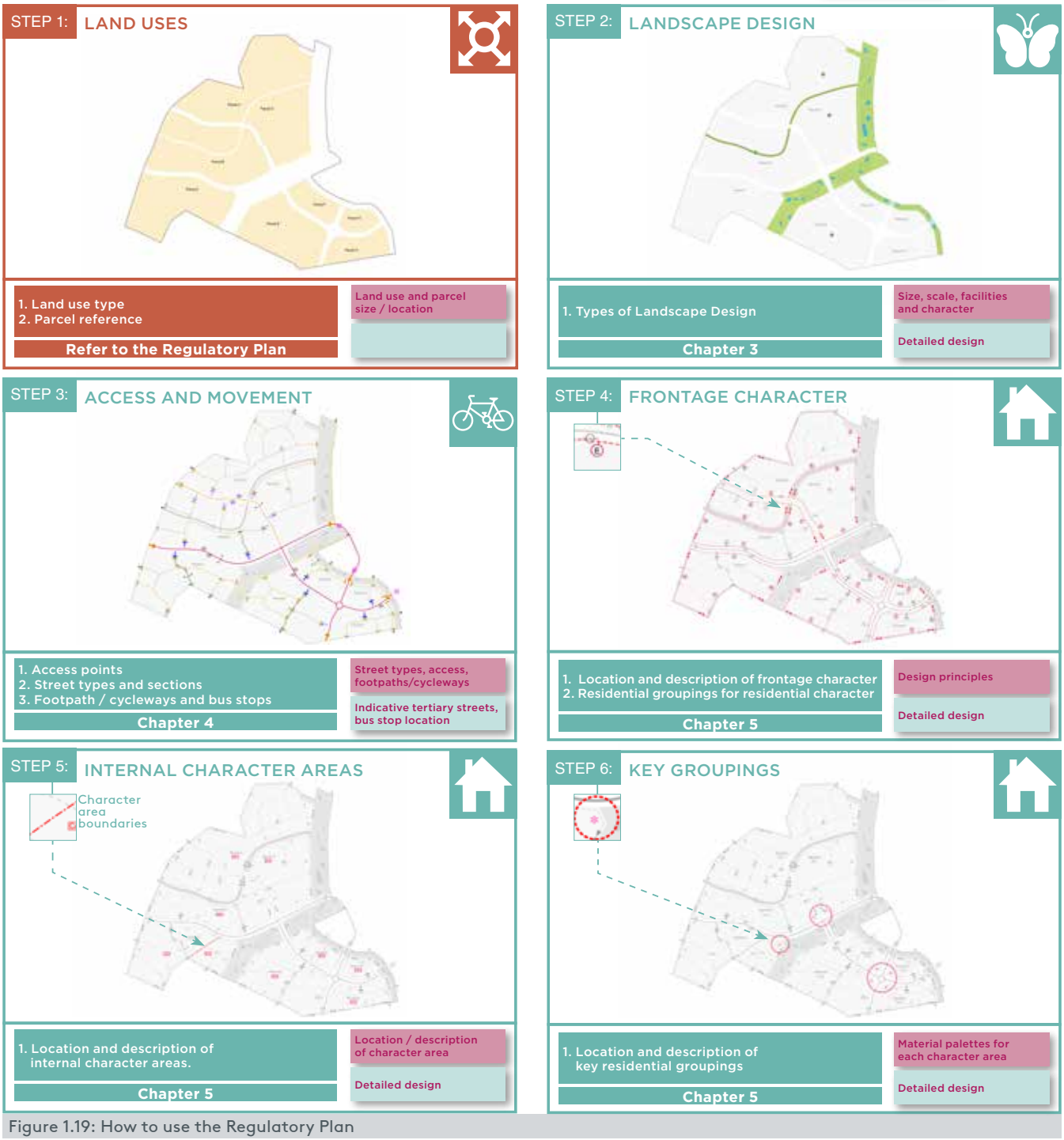


Figure 1.19: How to use the Regulatory Plan

1.9 DESIGN CODE COMPLIANCE CHECKLIST

Reserved Matters planning applications must be accompanied by a completed Compliance Checklist showing how proposals accord with the Design Guide's mandatory principles and guidance.

The checklist can be completed through an assessment of the proposal under each of the Checklist Items. They can also be assessed, according to the degree of compliance against each.

"Yes" is awarded to proposal features that are considered to be wholly compliant with the fixes in the Design Guide as listed in the checklist. "No" is otherwise awarded to proposal features that do not comply with the Design Guide fixes.

Code Breakers

If development proposals do not comply with design fixes, it is the responsibility of the design team to explain why any mandatory elements and guidance are not met and demonstrate that the proposals do not conflict with the overall aim of the Design Guide and the Regulatory Plan.

Departures form the Design Guide will only be acceptable when a clear justification can be provided for not complying with the mandatory design fixes and guidance can be clearly demonstrated as a positive intervention that has place making benefits, or responds appropriately to changing legislation, circumstances and/or technological advancement. It may be necessary to depart from some aspects of the Design Guide in light of unforeseen issues. Any such non-compliance will be subject to the agreement of the master developer (Urban&Civic) and / or RBC.

Planning & Highway Design Requirements

Additional checklists for planning and highway design requirements are set out in Appendix 3, as with the Design Code requirements the checklist can be completed through an assessment of the proposal under each of the checklist items to ensure that Reserved Matters Applications have considered and responded to each item.

Design Guide Review

In the future a review of the Design Guide may be required to reflect changing and unforeseen circumstances, including updates to national and local policies and the results of site and ground investigations. Any review would be undertaken by mutual agreement between the master developer and RBC.

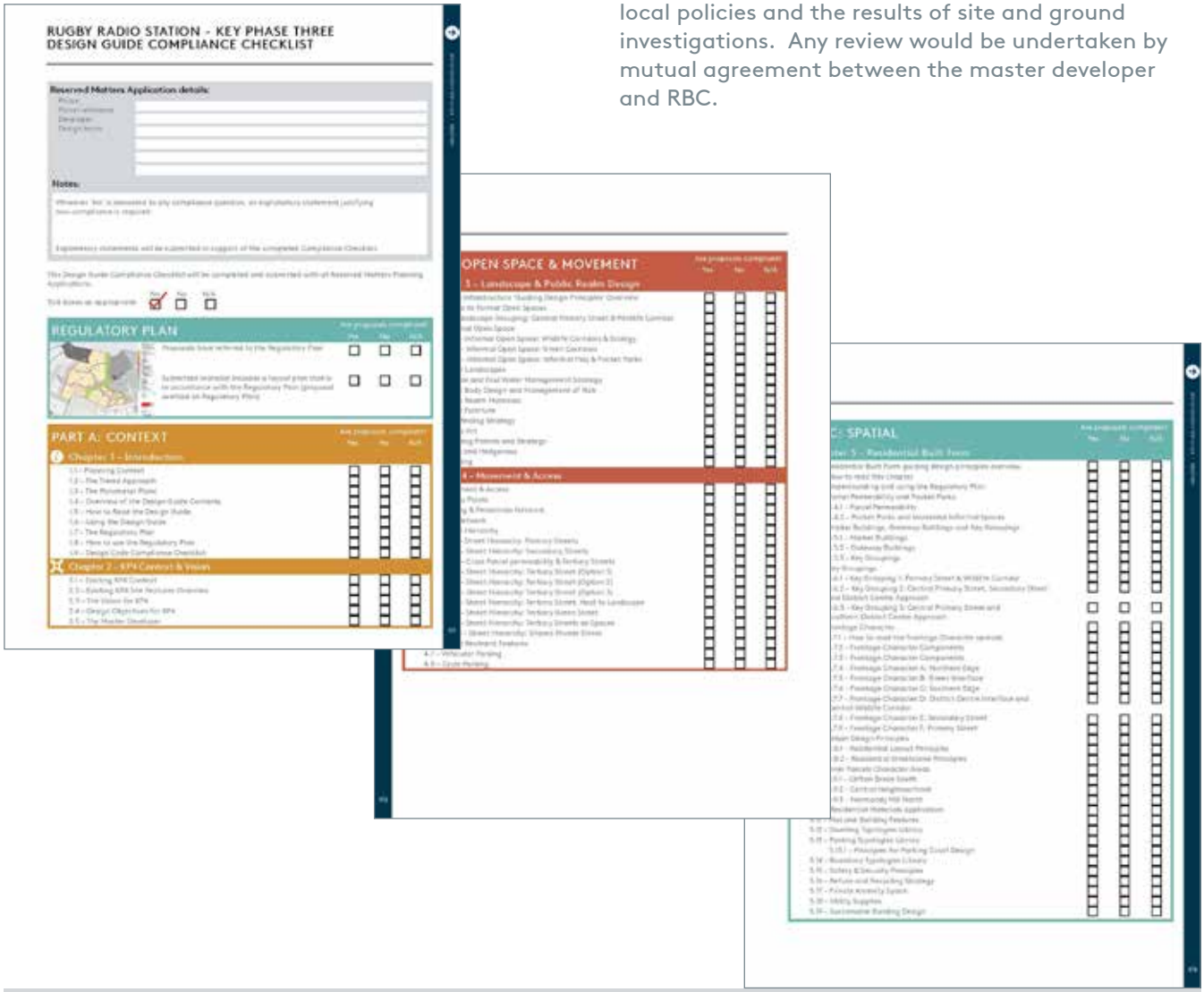


Figure 1.20: Design Guide Compliance Checklist, extract. See Appendix 2 for full version

Chapter 2

KP4 Context & Vision

2.1 EXISTING KP4 CONTEXT

KP4 is located centrally within the wider Houlton site. KP4 provides a logical connection between existing KP2 and KP3 at the western end of the site. The western boundary of KP4 will adjoin the defined boundary of KP3 and the southern boundary will adjoin the northern boundary of KP2. The eastern boundary of KP4 connects to green infrastructure associated with the emerging Houlton Secondary School and future residential and mixed use parcels associated with the proposed District Centre.

In close proximity to KP4's eastern boundary is the Grade II Listed C Station Building. C Station forms part of the approved 6FE Houlton Secondary School. Reserved Matters Approval (outside of a Key Phase) and Listed Building Consent was granted for the Secondary School in September 2019 and the school is on track for opening in September 2021.

The Central Primary Street which connects the Link Road known as Houlton Way will serve KP4 as the constructed route connects to the majority of parcels proposed within this Key Phase and provides a connection between the A428 and KP1 to the eastern side of Rugby's Town Centre and Railway Station.

The KP4 site is currently vacant though parts have been subjected to site enabling works such as great crested newt translocation, site investigation and archaeological trenching. Prior to this the site was utilised as managed pastureland with existing field boundaries predominantly delineated by hedgerows.

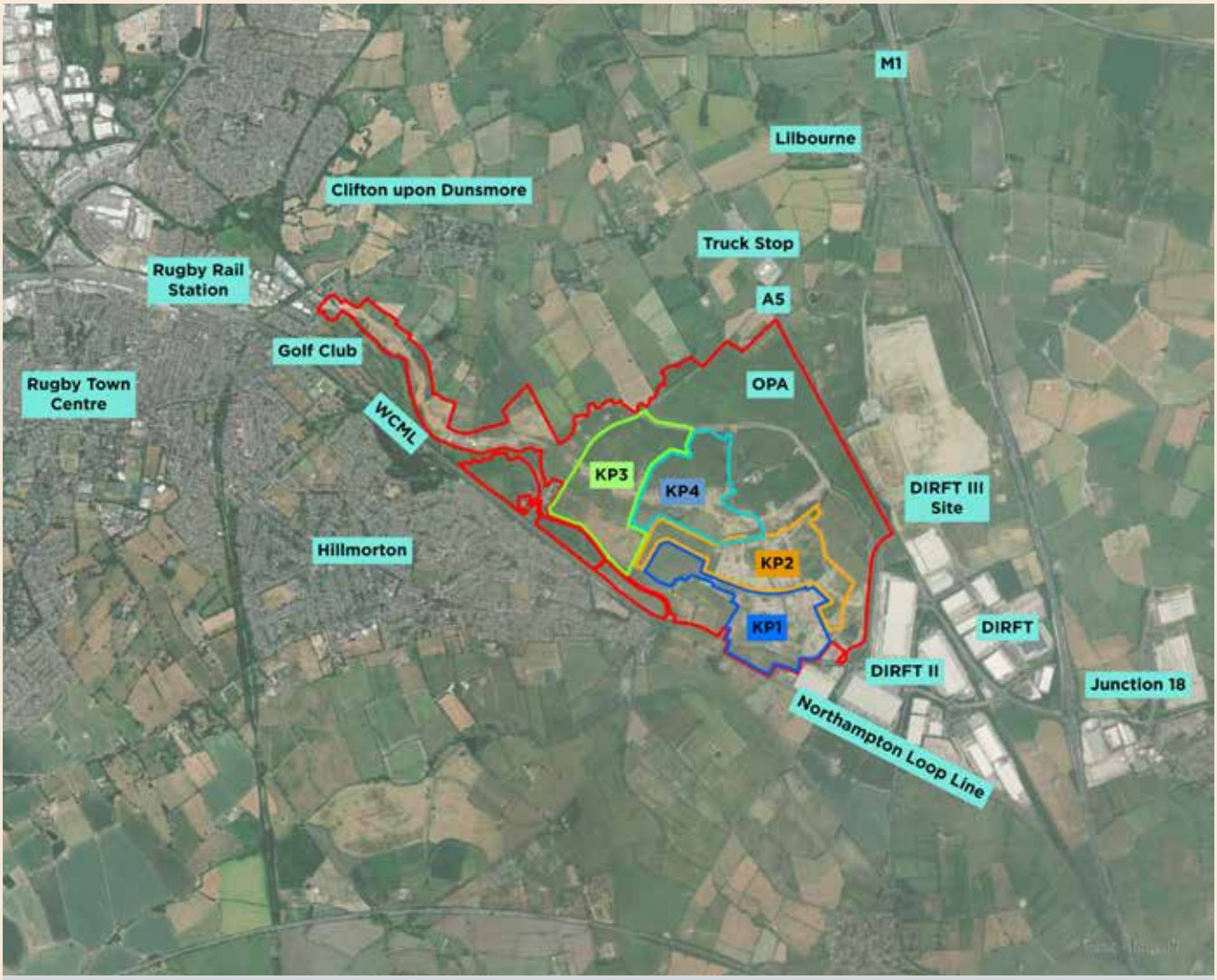


Figure 2.1: Houlton Aerial Photograph with Key Phases

2.2 EXISTING KP4 SITE FEATURES OVERVIEW

Existing KP4 site features are listed below and illustrated on Figure 2.2, these include:

TOPOGRAPHY

- Local topography is illustrated in Figure 2.2 is notable for the highest area of the site close to the northern edge of Normandy Hill and falling across the site to the northern boundary.

LANDSCAPE

- The site was utilised as managed pastureland with existing field boundaries predominantly delineated by hedgerows. Parts of the site have been subject to enabling works such as great created newt translocation, site investigation and archaeological trenching.
- Ridge and Furrow earthworks are a strong feature across the Radio Station Rugby Site, and areas outside KP4 such as Normandy Hill and Clifton Brook are to be retained as Preservation Areas around the wider site to the south and west of KP4.

HERITAGE

- KP4 lies to the west of the Grade II Listed C Station which is being repurposed to form part of the Secondary School.
- The curtilage Listed A Station was located within the site towards the western edge and was demolished as part of a Listed Building Consent granted in September 2019.

ACCESS

Access and movement considerations for KP4 and the local context include features listed below and illustrated on Figure 2.2.

- The movement structure is provided via the Central Primary Street which connects to the Link Road North to the Primary Streets within each Key Phase. Secondary and tertiary streets will flow from the Central Primary Street serving the development parcels and providing for a hierarchical street network. The Central Primary Street is subject to a separate reserved matters approval [R17/1744] and has since been constructed.
- Pedestrian access will be taken via the strategic footpaths, including a route along the wildlife corridor defining the western edge of KP3, from the northern edge of KP3, including the wildlife corridor along the eastern edge between KP4 and the secondary school and also from Normandy Hill to the south.

BUILT FORM

Existing built form considerations for KP4 include the Central Primary Street and existing substations and gad PRIs.

VIEWS AND VISTAS

Important views from and through KP4 include:

- View to/from C Station via the 60m wildlife corridor which spans through the centre of the site; and
- Views from the southern facing developed edge of the site south across Normandy Hill.

UTILITIES

No existing utilities are known within the KP4 area however substations and gas governors have been provided via reserved matters applications outside of a Key Phase and are shown on the Regulatory Plan.

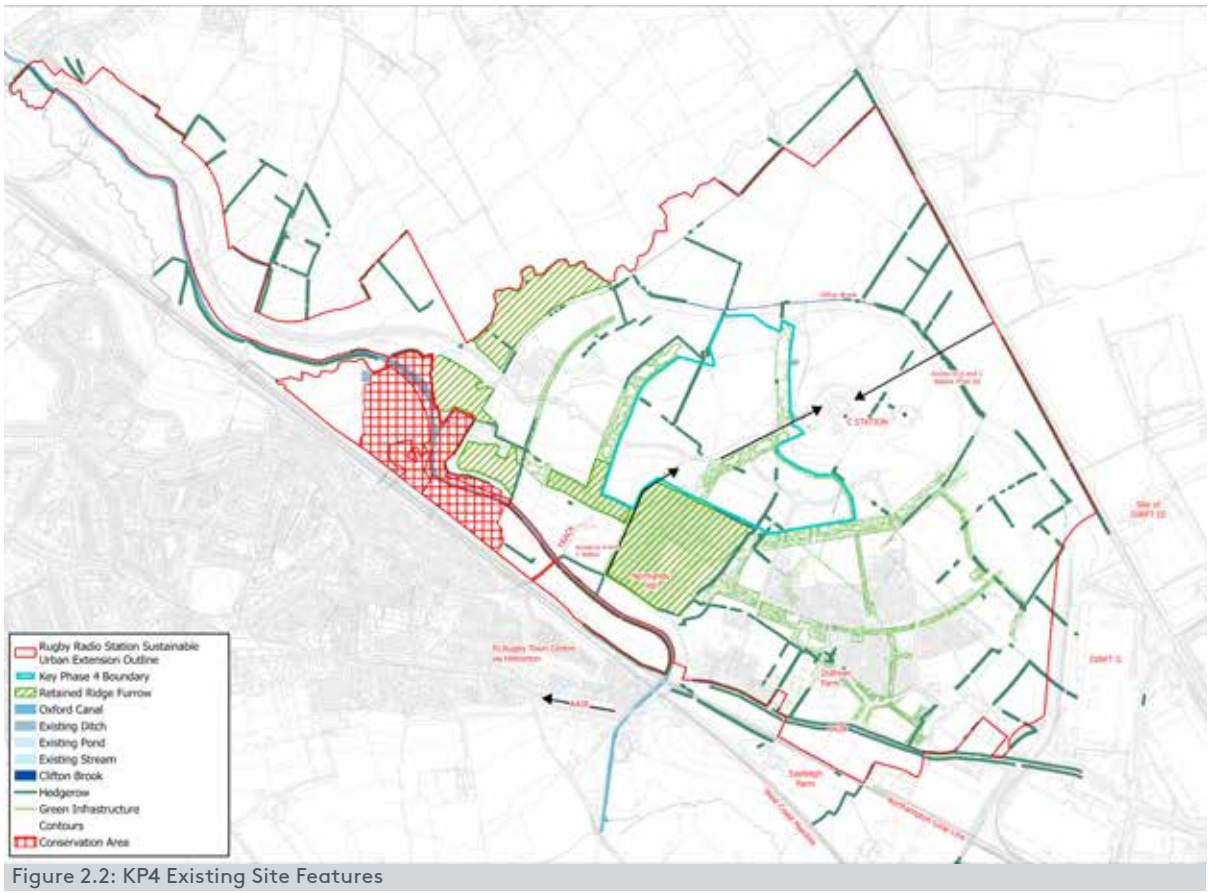


Figure 2.2: KP4 Existing Site Features

2.3 THE VISION FOR KP4

The earliest phases of Houlton took the form of new neighbourhoods of an informal character, with homes arranged in low to medium density layouts that evoke a village character. The longer-term plan for growth has always envisaged a gentle increase in housing density and, accordingly, in the formality of streets and spaces that make up those subsequent neighbourhoods. This will ensure an appropriate transition in character as the development grows towards its future heart – the District Centre, and the secondary school at C-Station.

The District Centre at Houlton will be a focus for mixed uses and activities, and a location for taller buildings and a denser, urban form. As the neighbourhood located directly to the west of the District Centre, KP4 must reflect a transition from the less formal character of development displayed by KP2 and KP3, and introduce a more recognisably urban structure, one that will ultimately allow this part of Houlton to seamlessly integrate with the busier and denser environment immediately to its east. There will be a gradual lessening in this urban/ formal character as development extends further from the centre towards the less formal development parcels in KP2 and KP3 and the 60m wildlife corridors that demarcates the western edge of KP4.

Within KP4, the design approach can be encapsulated as 'traditional form – contemporary detail'. Residents will benefit from a broad range of new homes adapted to different stages of life, including a variety of tenure choices, designed within a range of typologies that support the higher development densities in KP4. KP4 will be characterised by a relatively formal built form along its principal streets, particularly so within parcels closest to the District Centre, with a clear sense of linearity and enclosure, reinforced by formal street tree planting. Housebuilders will be required to create well-defined streets that feature rhythm and repetition in terms of the use of housetypes and their setting out. Along these streets, variety will be introduced through subtle measures relating to detail and colour: the prevailing character will be one of consistency and coherence through built form. Away from the principal streets and frontages, built form will become relatively less formal, with variation in alignment intended to create variety and interest.

Sustainable homes will be developed within parcels defined by an expansive network of green corridors and attractive streets that will facilitate direct access from homes towards the District Centre and Primary and Secondary School at the centrally located school campus. Green corridors and primary streets will be the focus for views directly through this phase towards the Grade II Listed C Station Building which once defined the centre of the site and will define the centre of Houlton.

A strong network of green spaces and streets will allow KP4 to be permeable and well connected to the District Centre, neighbouring residential phases, Rugby and DIRFT by a range of transport choices and opportunities. Proposals will maximise opportunities for the use of sustainable travel modes, particularly walking, cycling and public transport via Houlton Way which passes through the centre of KP4. The new neighbourhood will benefit from a choice of safe and attractive pedestrian and cycle routes as part of new streets and through the wildlife corridor network, providing critical connections between jobs, homes and open spaces. Importantly, the network of wildlife corridors will connect KP4 to open spaces elsewhere in Houlton, including formal open spaces and sports pitches located in neighbouring key phases, ensuring that residents are provided with greater opportunities to lead active and healthy lifestyles.

Figure 2.3: KP4 Illustrative Masterplan


C - STATION
DISTRICT CENTRE
KEY PHASE 2

2.4 DESIGN OBJECTIVES FOR KP4

The following table lists the overarching objectives that the design of KP4 (KP4) should achieve when implemented. The objectives, drawing upon the context sensitive and high order principles set out in the Design and Access Statement supporting the OPA, are set out in the left hand column and the way in which they are to be achieved is set out in the right hand column.

An appropriate Western Gateway to the District Centre.

Homes addressing well landscaped wildlife corridors.

Development of an appropriate density and scale to interface and complement higher density development at the edges of the District Centre.

Importance of frontages to open spaces and landscape.

KP4 OBJECTIVE	DESIGN RESPONSE
CONSIDER KEY INFLUENCES	• The structure of the Regulatory Plan responds to key influences, notable opportunities for access and connections, and respects existing landscape and ecology features.
UTILISE KEY ASSETS	• With a Green Infrastructure network that responds positively to landscape and ecology assets and to structure development, routes, spaces and view to celebrate heritage features such as the Grade II Listed C Station
FACILITATE COMMUNITY COHESION	• The Regulatory Plan creates a structure and layout that supports community cohesion with connections to the approved Link Road which leads towards Rugby town centre, Primary Schools and Secondary School, District Centre, formal and informal open spaces, linked by a permeable network of street and footpaths:
CULTURAL PROGRAMMING	• The Regulatory Plan incorporates connections to the heritage of the wider Houlton site, including to retained areas of the Ridge & Furrow landscape along with settlement related earthworks.
A LOGICAL EXTENSION TO RUGBY IN RELATION TO MORPHOLOGY AND CONNECTIONS	• The Regulatory Plan is structured by a comprehensive network of streets, footways and cycle paths creating a variety of connections through, KP4 linking to the CPS and to the Link Road.
SUCCESSFUL DEVELOPMENT EDGES	• Although KP4 is located centrally within the Houlton site it has prominent edges that overlook green infrastructure corridors around towards the edges of KP3, KP2 the District Centre and Secondary School, and the informal open space to the north of KP4. A high quality design response will be required at these key prominent edges including: • High quality architectural design, particularly for housing that address the wildlife corridors, open spaces and Central Primary Street; • Excellent landscape design response, to help integrate KP4 with the wider landscape setting and context of Green Infrastructure, including the wildlife corridors and neighbouring open spaces, including Normandy Hill. • Housing that will enclose the 60m green corridor through KP4 to frame an important axis towards C Station.
HIGH QUALITY DEVELOPMENT	• Proposals will follow the guidance set in the Design Guide and Regulatory Plan to help ensure a high quality development of landscape, routes and built form within KP4.
WESTERN GATEWAY TO THE DISTRICT CENTRE	• Development will create an attractive and welcoming Western Gateway to the District Centre. • The Central Primary Street and wildlife corridor will form a visually significant approach towards the District Centre, framed by residential development with continuous active frontages built to define views towards the District Centre and the retained Grade II Listed C Station. • Key groupings will play a key role in guiding people moving through KP4 and towards to the District Centre, supported with prominent and recognisable landmark buildings, to enhance legibility and strengthen the logic of KP4's structure and layout.
CREATING A POSITIVE INTERFACE WITH THE DISTRICT CENTRE WITH HIGHER DENSITY DEVELOPMENT	• Higher density residential development will be delivered in KP4 with an overall range of 35-40 dwellings per hectare. There will be a particular emphasis on delivering the higher density development towards the eastern edges that will ultimately form an interface with the immediate edges of the neighbouring District Centre.

Figure 2.4: KP4 Objectives and Design Responses

Active frontages to address public realm.

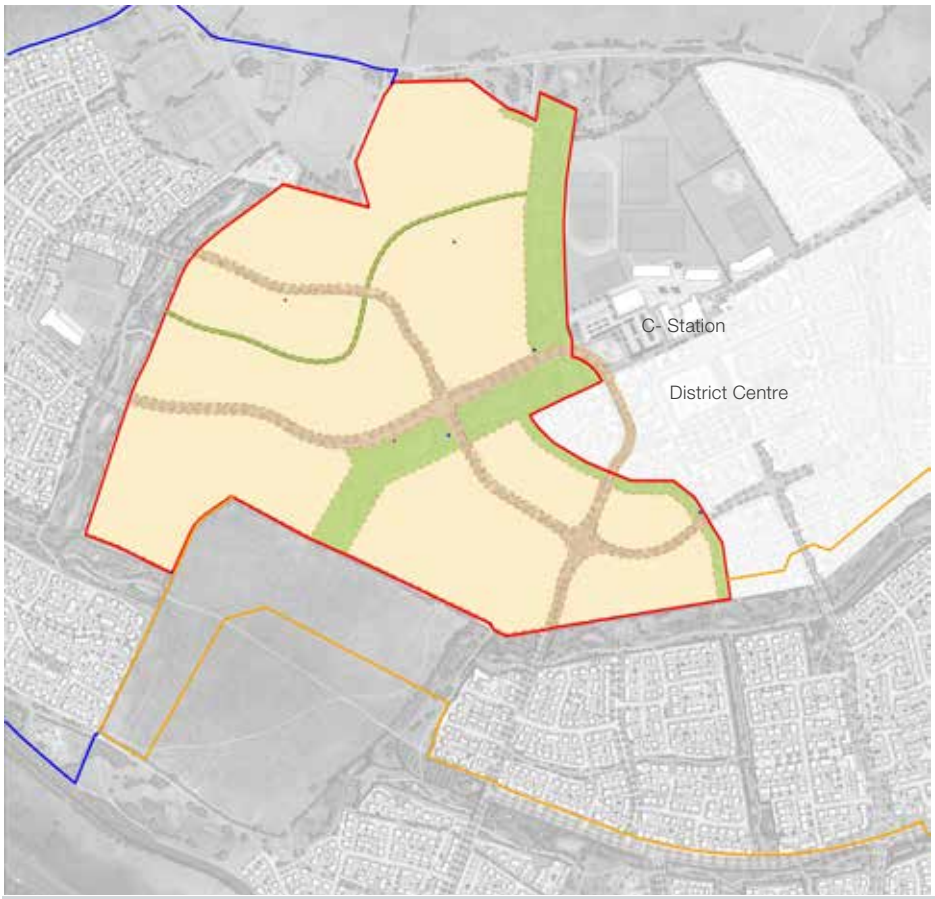
Opportunities for contemporary design.

Neighbourhoods where walking and cycling are first modes of choice.

Key Groupings.

KP4 OBJECTIVE	DESIGN RESPONSE
DEVELOPMENT IN RESIDENTIAL PARCELS TO INCLUDE HIGH QUALITY LANDSCAPE DESIGN	• The design of residential development parcels will demonstrate commitment to continue high quality design of landscape and public realm, led by the master developer's provision of a high quality Green and Grey Infrastructure Framework for KP4. • Notable landscape design features include the sensitive treatment of residential edges that will overlook the wildlife corridors, Normandy Hill, Secondary School playing fields and the sports field and rural edge to the north.
DISTINCTIVE IDENTITY	• The Design Guide sets material palettes for public realm, landscape design and built form to help ensure a consistency in approach and specification. • Guidance for character areas within KP4 is provided in the Residential Built Form chapter to guide appropriate design responses related to location and neighbouring land uses.
WALKABLE AND CYCLING NEIGHBOURHOODS AND PERMEABLE NETWORK OF STREETS	• Walking and cycling routes are integrated into the layout with a choice of legible routes created with permeable development blocks served with an attractive and legible network of streets. Wildlife corridors integrate recreational routes. Overall, the structure of development and open spaces aims to encourage walking and cycling as modes of primary choice within KP4 and to other localities in Houlton, particularly the District Centre and formal open spaces neighbouring KP4.
ACTIVE FRONTAGES	• Homes will be designed to predominantly address the public realm to ensure streets and spaces will be overlooked providing natural surveillance. This is particularly important for pocket parks, wildlife corridors and the Central Primary Street, and particularly the section framing views towards C Station and the District Centre.
OPPORTUNITY FOR CONTEMPORARY DESIGN	• A contemporary design approach to built form proposals, one that interprets the Design Guide principles in a contemporary style will be looked upon favourably by Rugby Borough Council.
AN EXTENSIVE AND DIVERSE GREEN INFRASTRUCTURE SETTING	• The proposals will facilitate a green infrastructure network of wildlife corridors to encourage biodiversity and quality landscape creation, along with high quality spaces within the street network including informal pocket parks. Consideration must also be given to the relationship of development with wildlife corridors and open space spaces that lie adjacent to the edges of KP4 – Normandy Hill and the sports field and rural edge to the north.
VIBRANT AND DESIRABLE MIXED COMMUNITIES	• A range of residential homes will be provided to offer housing opportunities for a wide range of people and households. • Good attractive and safe connections will be provided between KP4 and the district centre and primary and secondary schools to ensure that they are highly accessible.
SUSTAINABLE DESIGN	• Sustainability is embedded in the proposals for KP4 at the macro scale (for instance establishing a permeable network of streets and routes that supports walking and cycling and public transport provision) and micro scale (integrating electric vehicle charging points allowing for technologies such as photovoltaics, air source heat pumps to be integrated easily as they become more widely available)
KEY GROUPINGS OF DISTINCTIVE URBAN FORM	• The proposals will provide the setting for innovative architecture to highlight the significance of Key Groupings within KP4.

2.5 THE MASTER DEVELOPER



KEY

- Housebuilder Parcels
- Wildlife Corridors
- Road Infrastructure
- Green Corridor
- Key Phase 2 Boundary
- Key Phase 3 Boundary
- Key Phase 4 Boundary
- Existing PRI Location
- Existing Sub Station

Figure: 2.5: Elements of KP4 to be delivered by Urban&Civic and precedent images of completed parts of Houlton.


THE
TUNING
FORK

PART B

Open Space & Movement

Chapter 3
Landscape & Public Realm Design

3.1 GREEN INFRASTRUCTURE 'GUIDING DESIGN PRINCIPLES' OVERVIEW

A connected Green Infrastructure network will be provided within KP4 in accordance with the Regulatory Plan (Figure 3.1), and is composed of a range of complementary open space typologies, including:

- Connection to the wider parks and gardens that are sited to relate well to community hubs such as the 'Civic Space' and tie into the wider play, biodiversity and movement strategies.
- A landscape grouping focussed to enhance the setting of the key marker building, where the central Wildlife Corridor and Central Primary Street Way converge.
- A multifunctional wildlife corridor network that has been developed primarily to preserve and protect the existing colony of Great Crested Newts (GCN) within the site, but also provides wider biodiversity and informal recreation opportunities.
- 'Green Streets' where the highway network of Primary, Secondary and residential streets include the planting of street trees as both formal avenues and informal groupings depending on the scale and context of the street.
- Opportunities for informal play within residential pocket parks and incidental open spaces that are distributed throughout the development parcels.
- Private amenity spaces that supplement the public open space network and contribute to the character of the street scene.
- Productive landscape elements that may include community orchards, and informal 'on-street' strategies where possible.

Figure 3.1: Green Infrastructure extract from Regulatory Plan

3.2 ACCESS TO FORMAL OPEN SPACES

Formal open spaces are not incorporated into KP4. However, the adjacent Key Phases – KP2 and KP3 include publicly accessible formal Play Area provision (i.e.: LEAPS/NEAPS), Formal Parks and Sports Pitches. The Secondary School also has facilities which will be publicly accessible outside of teaching hours.
Safe pedestrian links are provided from KP4 to these formal, open spaces, and will be achieved through use of the following principles:

Access to Play Areas

Play areas including a LEAP and NEAP which are located to the north west of KP4 in the sports field in KP3. A LEAP is located in the south-west of KP3 which can be accessed via the wildlife corridors and Normandy Hill. A LEAP is also located to the south east of KP4 on the northern edge of KP2.

Access to Formal Parks

Formal Parks that are accessible from KP4 include in KP3 towards the western edge on the Central Primary Street and also to the south east of KP4 at the northern edge of KP2.

Access to sports pitches

Sports pitches have been provided as part of the KP1 of RSR which are within catchment of KP4. Formal sports pitches are proposed to the north west of KP4, within the northern edge of KP3. Additional sports pitch provision is also proposed to the east of the RSR development which should also be within catchment. The Secondary School will also include sports facilities which will by accessible to the public outside teaching hours.

Figure 3.2: Location of Formal Open Spaces

3.3 KEY LANDSCAPE GROUPING: CENTRAL PRIMARY STREET & WILDLIFE CORRIDOR

A key Landscape Grouping has been identified in KP4 and is essential for supporting the Residential Built form Key Grouping where the Central Primary Street and Wildlife Corridor converge from the west and lead towards the District Centre along a single combined corridor. The converging point is important in contributing to the structure and legibility of the development, with a marker building which will play a key role in terminating views from the District Centre. Landscaping will play an important role in defining its setting.

The mandatory design principles describe the landscaping layout and will all be adhered to; the illustrations describe how this will be achieved.

MANDATORY DESIGN PRINCIPLES (M)

- Landscaping will blend seamlessly with the Wildlife Corridor
- Landscaping will provide a positive setting for a visually prominent marker building that will terminate views along the Central Primary Street and Green Corridor from the District Centre.
- Public art will be considered within the design of the landscape - opportunities may include creating features through planting, landforms, street furniture and signage (including locating past heritage features).

Figure: 3.3: Key Landscape Grouping highlighted on Regulatory Plan

Precedent – Landscape Grouping complementing Wildlife Corridor

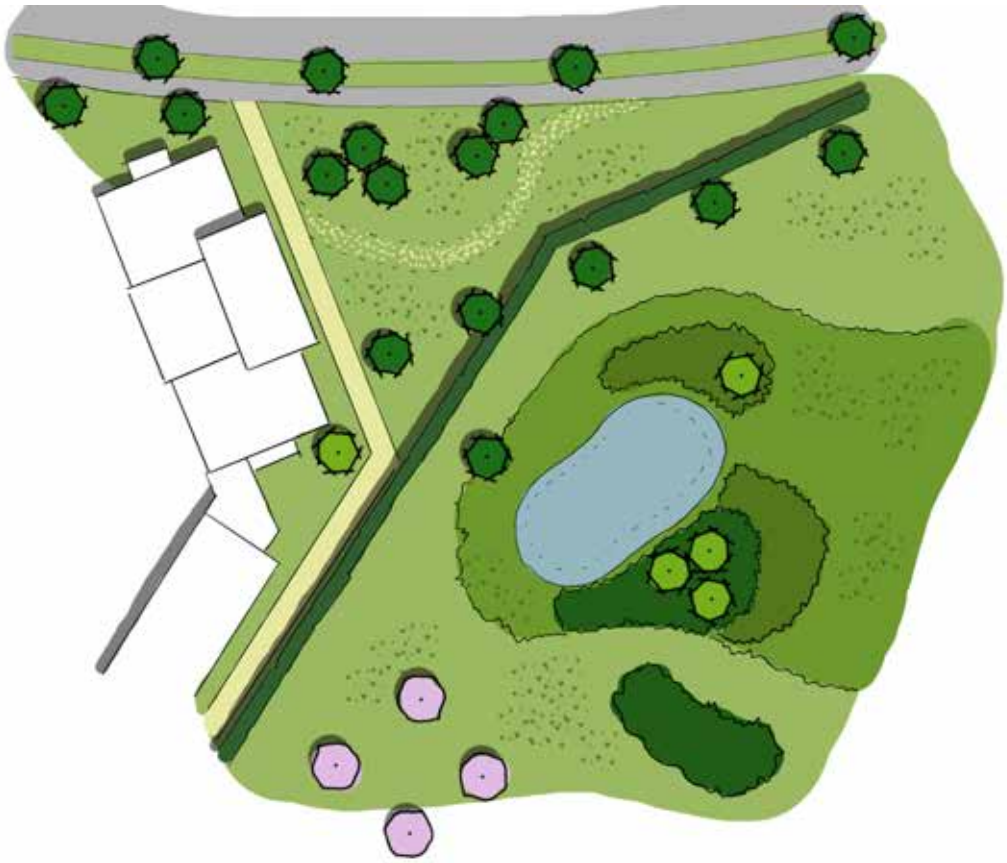


Figure: 3.4: Sketch concept for Landscape Frontage

3.4 INFORMAL OPEN SPACE

Informal open spaces help to create the landscape setting for KP4 and will tie into the wider Radio Station Rugby open space strategies, including the areas established as part of the KP1, KP2 and KP3 development works.

Whilst the wildlife corridors form the key structural 'backbone' of the informal open space network, a range of complementary landscapes will be developed to create a strong green network across the Phase. These will include a Green Edge, informal play opportunities, and Green Corridors and Green Streets.

The required amenity spaces can be balanced with more biodiverse mosaics such as long grass swathes, ponds and swale features and significant features such as tree lines and hedgerows.

These informal open spaces will be delivered and developed in accordance with the Regulatory Plan.

Informal open space will comprise:

- Wildlife corridors – 60m and 20m see Section 3.4.1.
- Green Corridors see Section 3.4.2.
- Informal play and residential pocket parks see Section 3.4.3.

Green Streets will form part of the street hierarchy, and therefore further details are provided in Chapter 4.

Precedents (above) - Wildlife corridors implemented in Key Phase 1

Figure 3.5: Informal Open Space highlighted on Regulatory Plan

3.4.1 INFORMAL OPEN SPACE: Wildlife Corridors & Ecology

Overview

The design and management of all Green Infrastructure including open spaces should take measures to maximise any opportunities for ecology and biodiversity. Tree and plant species should be diverse and include native flora that is specific to the region.

Throughout all public open spaces and within the streetscape, planting should provide foraging and habitat for local fauna and flowering species should be incorporated to attract invertebrates and butterflies.

Hibernaculum that utilise natural materials such as logs and boulders should be strategically located at regular intervals within informal open spaces, providing habitat and refuge opportunities. Ecological ponds scattered along key wildlife corridors will include enhanced meadow and marginal planting and a hibernacula to attract and accommodate local wildlife.

Wildlife Corridor ecological features (above)

Great Crested Newt (GCN) Mitigation Strategy

The dedicated Green infrastructure network for KP4 has been designed with a site-wide focus, ensuring that the extent and design of wildlife corridors will retain and enhance opportunities for biodiversity overall, not least GCN. Indeed, the locations of existing GCN habitat have been of primary importance in forming the Green Infrastructure strategy for KP4.

A reserved matters scheme has been submitted to and approved by RBC (ref: R17/1297 and R18/0785) and comprises a series of primary (60m wide) and secondary (20m wide) wildlife corridors. These are designed principally as habitats for the GCN but also to provide new and enhanced opportunities for the range of other protected and notable species present on site. Fundamentally, the wildlife corridors will also accommodate a range of complementary features and activities – including sustainable drainage elements and publicly accessible walking routes (see Figure 3.6).

A scheme for the mitigation of impacts on GCNs within KP4 has been developed in accordance with the site wide mitigation strategy which ties into the completed KP1 & KP2, and KP3 Green Infrastructure schemes.

The wildlife corridors include new and retained enhanced ponds and associated hibernacula's set within expansive areas of wet and dry meadow grassland habitat. Additional hedgerow, native shrub and woodland planting areas are to be created throughout the corridors to ensure a mosaic of species-rich habitats.

The form and arrangement of the wildlife corridors is consistent between the KP4 Regulatory Plan and the Green Infrastructure reserved matters scheme (as approved for the CPS and Secondary School proposals). Moreover, this scheme accords with the site-wide strategy for Green Infrastructure creation and will ensure site wide ecological connections are delivered post-development.

A Natural England license has been obtained to facilitate KP4 Green Infrastructure delivery. Under this licence newts trapped within KP4 will be translocated to the KP4 holding area whilst the remainder of the KP4 Green Infrastructure is implemented.

The translocated newts will then remain within the holding areas for 2 years, at which time the population will be released into the wider Green Infrastructure network (Including habitats created in KP1, KP2 & KP3).

Delivery of the wildlife corridors and other ecological mitigation measures within KP4 will be via implementation of the Green Infrastructure reserved matters approval, in accordance with the Natural England license approved for the scheme. The details enclosed in this part of the Design Guide are to inform housebuilders of the surrounding context to their parcels being brought forward, rather than seeking to provide guidance for any green infrastructure application being brought forward.

Figure 3.6: KP4 – Overview of the current approved Wildlife Corridors

3.4.2 INFORMAL OPEN SPACE: Green Corridors

Green Links provide an additional form of green landscape route through development parcels that supplement the network of landscape connections in the wildlife corridors and public spaces.

MANDATORY DESIGN PRINCIPLES:

- The Green Corridor is to be between 5-8m in width.
- The Corridor should include a combined footpath and cycle path route that are separate from the roads to form a safe green link running east-west through the Key Phase.
- The Green Corridor is defined by overlooking residential dwellings and deep front gardens that complement the wide, green public open space.
- Front gardens will generally be defined by informal shrub and tree planting. This should be designed to give the impression that frontages spill out onto the Green Corridor. To introduce variation, and where dwellings require more direct screening, hedges could also be used.
- Hard surfacing materials are selected to reinforce a shared-surface approach through 'informal' tones and arrangements.
- The Green Corridor includes a range of informal landscape elements including informal play opportunities, seating areas, community orchards, outdoor gyms/trim trails etc. to create a well-used, safe and welcoming public realm resource.

Figure 3.7: Green corridor highlighted on Regulatory Plan

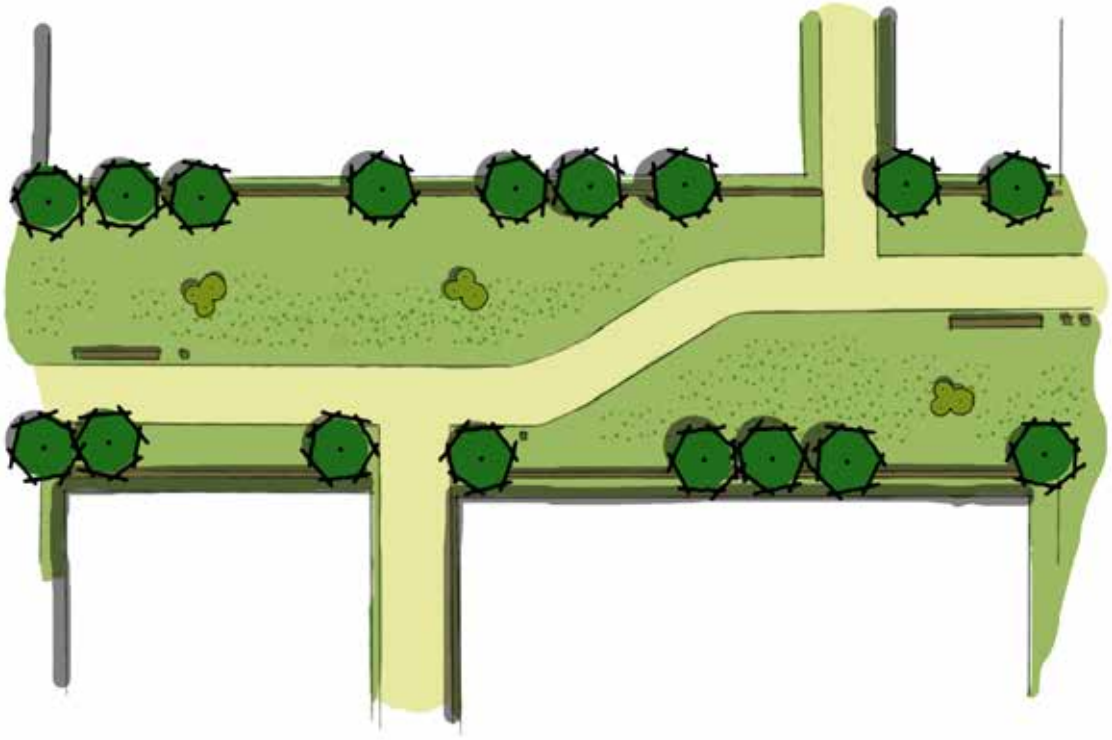


Figure 3.8: Sketch concept for the Green Corridor

3.4.3 INFORMAL OPEN SPACE: Informal Play & Residential Pocket Parks

Additional play and recreation elements are to be located throughout the development in the form of natural play elements and pocket parks.

These spaces should include landscaping that will provide a corridor through the built environment facilitating the movement of wildlife. Where possible existing natural features should be incorporated. Measures should be taken to optimise the wildlife corridor affect through features such as species-rich hedgerows, wildlife boxes (bird, bat, invertebrate and hedgehog domes) and invertebrate banks. These spaces are shown on the Regulatory Plan and in accordance with the following design principles.

MANDATORY DESIGN PRINCIPLES:

- Smaller, naturalistic areas located within residential parcels. These are more are intimate spaces for local residents and benefit from the natural surveillance of surrounding dwellings.
- Provide a visual break in the built development with a design that is compatible with and proportionate to the surrounding dwellings.
- Characterised by native tree and shrub planting, areas of open space and natural play features that may include trim trails, outdoor gyms and exercise features.
- Incorporate seating and other distinctive features to provide identity and assist in wayfinding.
- In accordance with Fields in Trust standards, 100 sqm with a minimum buffer zone of 5m must be provided for each area.

Figure 3.9: Residential Pocket Parks highlighted on the Regulatory Plan

Precedent - Informal play opportunities within the 'Pocket Park'.

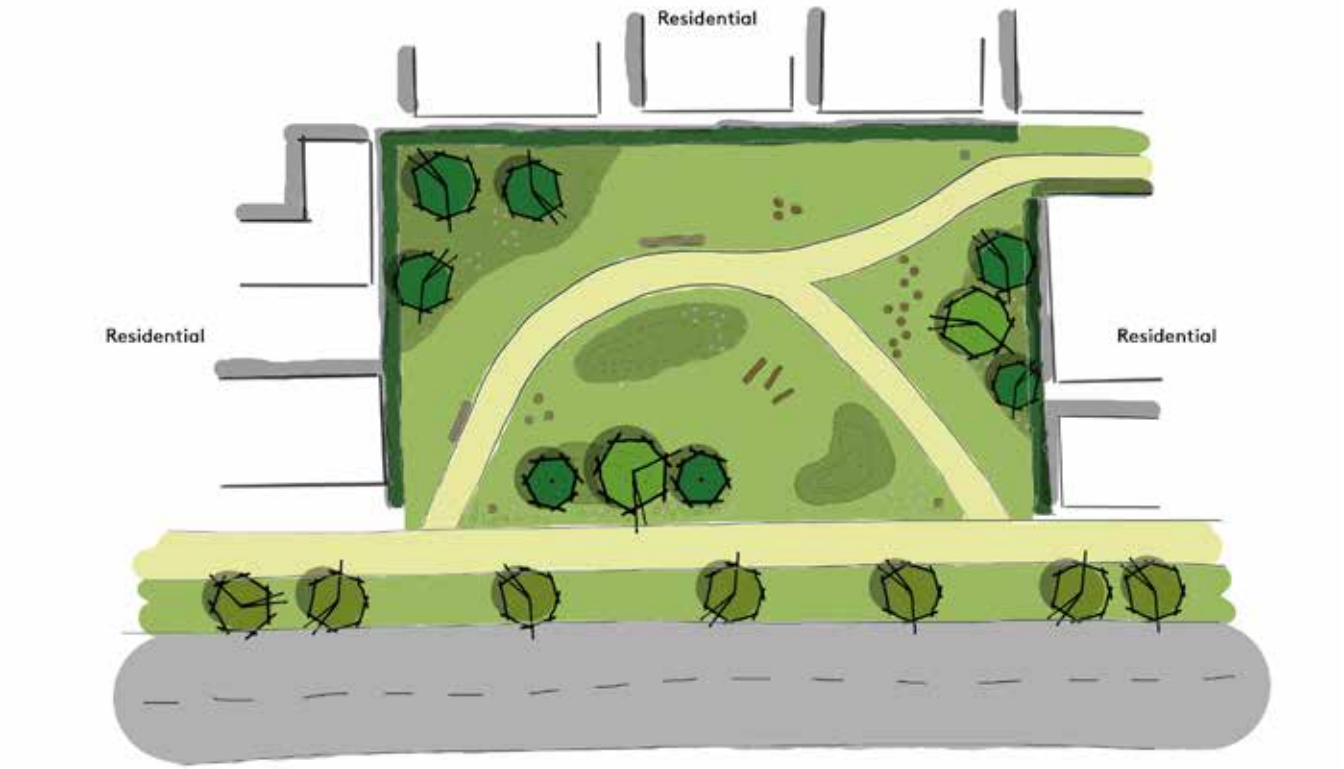


Figure 3.10: Pocket Park Concept illustration

3.5 PARCEL LANDSCAPES

Front Gardens

Private and semi-private spaces make up a significant part of the residential development and should be considered an important part of the overall landscape.

Front gardens make a valuable contribution to the street scene and help to promote a sense of identity and uniformity within landscape character areas. This section should be read in conjunction with Part C Chapter 5 Frontage Character.

MANDATORY DESIGN PRINCIPLES:

- The on plot landscape treatment should be informed and established as part of the developments overall design.
- The soft landscaping treatment and palettes should be enforced by the setting of the housing, character areas and surrounding landscape.
- A diverse range of habitats and elements can be accommodated within relatively small residential areas by ensuring that the spaces are made to work hard and contribute to the overall quality of the development.
- Tree planting should be promoted wherever possible and where space allows (refer to NHBC guidelines for appropriate species) throughout the private and semi-private spaces to help provide shade, create vistas, define character areas and provide nesting and foraging opportunities for birds, bats and other species.

Incidental Green Space

The incidental green spaces throughout the development, should be in keeping with the wider green space design, whilst providing a stepping stone of green infrastructure that adds to wider network of green space. Where possible these spaces should include small tree planting amenity grass and swathes of wild flower to bring seasonal interest and soften the hard landscape of development.

Incidental spaces that are in close proximity to larger green corridors and open space should include feature trees that mark the access points whilst also providing additional habitat planting that's benefits the local wildlife.

Figure 3.11: Incidental Green Space sketch concept

3.6 SURFACE AND FOUL WATER MANAGEMENT STRATEGY

The Surface Water Management Strategy for KP4 is based on the creation of a network of SuDS and will adopt the following mandatory design principles:

MANDATORY DESIGN PRINCIPLES

- SuDS features in KP4 will respect the site drainage patterns and seek to protect, restore and enhance natural wet areas.
- Residential design will include initiatives to reduce surface water run-off and improve water quality, with the priority being to collect, treat and store storm water through measures that utilise the Green Infrastructure whilst protecting residential amenity. Where residential design exceeds 50% contributing impermeable area, additional storage including SuDs will be constructed within the development plots to capture and attenuate the run-off.
- Capture rainwater as close to source as possible in Water Sensitive Urban Design (WSUDS) features.
- SuDS features are to be designed to enhance the character of the local areas whilst integrating planting and hardscapes in accordance with the wider KP4 strategies.
- Provide SuDS features in communal spaces and courtyards to capture and treat excess runoff.
- Provide connections to convey water to SuDS features in open spaces or to storage for use in landscape irrigation.
- Implement permeable paving where possible on shared and unadopted surfaces with filtering substrates to treat and convey surface water runoff.

SuDS Features

SuDS features will be chosen as appropriate from a palette of SuDS options including:

- Rain Gardens: Small garden areas that capture rainwater from roofs, assisting with controlled infiltration or re-use for garden irrigation, vehicle washing and other non-potable applications.
- Swales: broad, shallow channels covered by grass and vegetation. Designed for both dry or wet conditions they contribute to the wider Green Infrastructure Network.
- Filter Drains: trenches filled with permeable material into which runoff is collected, stored and conveyed.
- Permeable Paving: designed to allow rainwater to infiltrate through the hard surface into an underlying storage layer.
- Ponds: basins with permanent pools of water. Acting as a SuDS feature, they also have a biodiversity and recreational value.
- Detention Basins: depressions designed to detain runoff for a period of time to meet both volume objectives and water quality criteria. They differ from wet ponds in that there is no permanent pool of water in the basin.
- Geocellular Storage Systems: underground modular plastic units (crates) with a high porosity and wrapped with an impermeable membrane to provide an attenuation structure for temporary storage of runoff before a controlled release into the downstream surface water network. The units are typically located beneath private access roads and landscaped areas.

Residential Design

Two residential parcels (H and I) will be required to part attenuate excessive runoff on plot as the full site control SuDS attenuation volume cannot be accommodated within green infrastructure corridors. Refer to the KP4 Surface Water Drainage Strategy for further details.

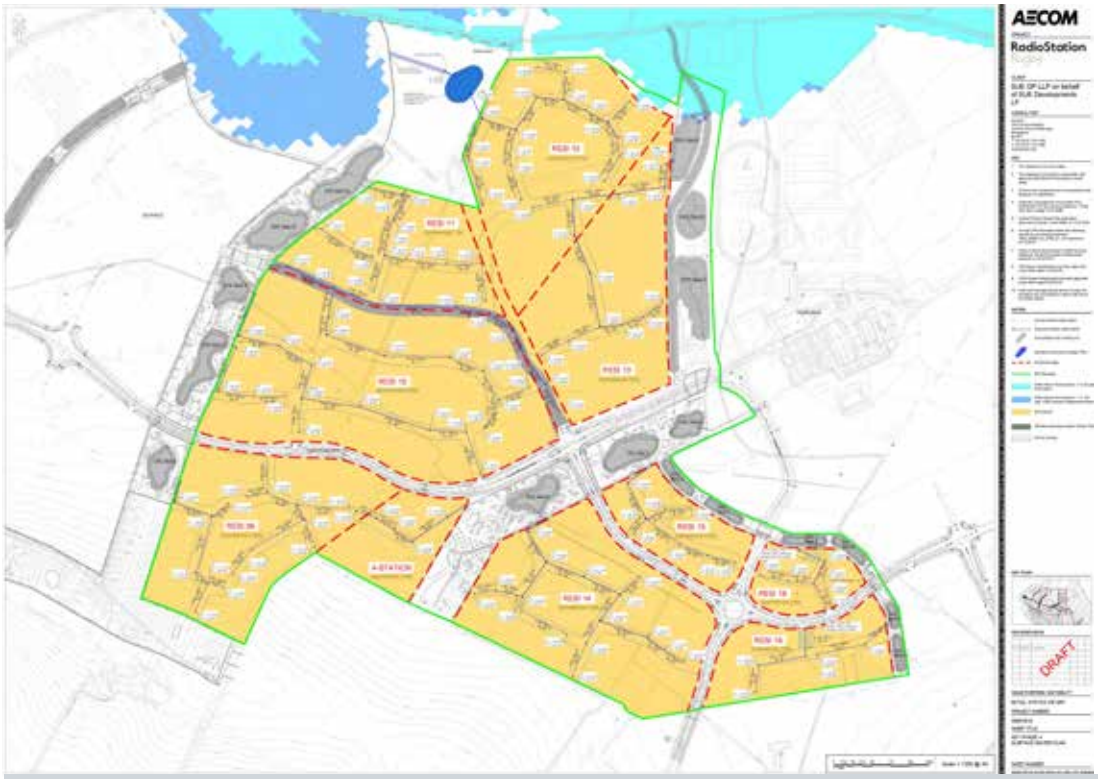


Figure 3.12 - Surface Water Strategy

3.7 WATER DESIGN AND MANAGEMENT OF RISK

The following mandatory principles will be followed in the design of water bodies:

MANDATORY PRINCIPLES

- SuDS features will be predominantly dry - it is reasonable to expect - in times of high water – that people will stay out of / away from the water.
- Safe play within these dry or shallow SuDS features is to be expected in supervised conditions.
- Proximity: where possible ponds are to be set away from footpaths and widely used areas.
- When set close to paths or busy places then informal barriers - including dense and thorny plant species should be used to keep people away from the edges.
- Visibility: the public must be made aware of the ponds either because they are visible from distance or - where screened by planting - signage is provided.
- Construction – New ponds will have shallow, sloping sides and no vertical edges to help with exit from the water.
- Signage, lifesaving equipment and fencing is to be provided where it is deemed necessary and appropriate.

Foul Water Strategy

The foul water drainage strategy for KP4 is for the conveyance of plot wastewater via new gravity drains and sewers with self cleansing velocities into the existing Central Primary Street foul water sewer or the Strategic foul water sewer (dependant on plot location).

These existing sewers will convey the flows to the existing Terminal Pumping Station at the western edge of the Houlton development which then pumps the flow to Newbold Sewage Treatment Works in Rugby.

Development foul water sewers are to be designed and constructed to S104 adoptable standards in accordance with the Design and Construction Guidance of the Ofwat approved Sewerage Sector Guidance.

Figure 3.13 - Foul Water Drainage Strategy

3.8 PUBLIC REALM MATERIALS

Streetscape Materials Palette

The specification of hard materials and furniture must ensure that the new development has a recognisable character and is constructed to adoptable standards where required.
Detailed applications for KP1, KP2 and KP3 have begun to set out the principles for material and furniture selection and these will continue to be applied to later phases. However, it is also recognised that standards and guidance are likely to change over the duration of the project.
Therefore, the materials and the furniture palette will be reviewed and agreed with the relevant planning authorities at the detailed design stage of each particular phase.
Ultimately a consistent 'family' of materials will create consistency and legibility across KP4 and the wider development.
To guide future detailed applications, the following overarching and mandatory principles are set out and future applications, must demonstrate how these principles have been observed.

MANDATORY PRINCIPLES

- Emphasise the pedestrian links along the connecting residential streets.
- Use materials that suggest a pedestrian friendly environment but have a 'traditional' refuge from the road.
- Use a simple palette with a coordinated range of colours, textures and tones to reinforce the street hierarchy and legibility.

The following materials represent an outline palette for the public realm areas:

- Primary Roads:
  Higher quality surfaces to footways and vehicular cross overs to signify importance in the street hierarchy (e.g. potential use of stone flag and block work, with macadam / black top asphalt option for footways). Macadam / asphalt surface to carriageway. Block paving to shared surface sections of carriageway.

- Residential streets:
  Block paving or asphalt to footways with 'black top' asphalt to carriageway surface.

- Shared surfaces:
  Concrete block/stone sett paving.

- Parking:
  Dark/contrasting sett paving.

- Footpaths in Public Open Spaces:
  Bound gravel/spray and chip finish macadam

- Civic Spaces:
  A range of bound and unbound footpath materials, stone flags, block paving and small unit pavers. Materials in areas put up for adoption will be agreed with WCC.

Any materials proposed that differ from the outline palette will need to be set out in a justification statement.

1. Resin Bound Gravel Paths to Informal Parks; 2. Loose Gravel to Temporary Landscape Spaces;
3. Block Paving to Formal Squares; 4. Timber Street Furniture

3.9 STREET FURNITURE

MANDATORY PRINCIPLES

- Street furniture will have an emphasis on simple, contemporary design with consistent product types to be used across the development.
- Furniture is to be sited to ensure an uncluttered streetscape and footways that are as free from obstruction as possible.
- Proposed elements are to be durable and sourced from recognised suppliers to ensure a reliable procurement and replacement process.
- Furniture along roads and streets should always be located within an approximately 1500mm wide zone that is set 450mm from the road kerb to lessen the scope for obstruction of routes.
- Where this is not possible, careful consideration must be given to the siting of elements to ensure an uncluttered streetscape. Elements will generally be grouped together or treated as combined elements to avoid 'standalone' items and clutter.
- It is anticipated that the development will generate a great deal of cycle traffic and therefore bike parking facilities will be incorporated into the streetscape, generally set in spaces between trees or in more open areas of paving near junctions or commercial frontages.
- Bollards are generally to be avoided, as appropriate to a low-speed, pedestrian friendly scheme.
- Electric vehicle charging points to be provided in accordance with the current Local Plan requirements.
- A detailed signage and wayfinding strategy will be developed with elements combined where appropriate (mounted on lighting columns etc.) to reduce street clutter.
- Public art strategies should also consider integrated bespoke features as part of the street furniture palette.
- Street lighting that is to be adopted should be agreed by WCC and in accordance with WCC specification.
- Street lighting that is to be adopted should be finished in black to reduce their visibility in the night time environment.

'Mood Board' - Typical Street Furniture Elements

3.10 WAYFINDING STRATEGY

The legibility of KP4 is important, not just for those visiting or passing through, but for the new community. Identifying where you are and how you move through KP4 is required on both a practicable level, as well as aesthetically. Natural wayfinding has been incorporated into the urban design of the masterplan, but can be enhanced with defined spaces for certain activities, planting and changes in materials through spaces and recognition of landmarks.

MANDATORY PRINCIPLES

- The wayfinding strategy must identify decision making locations and must furnish those locations with appropriate signage to aid in the decision making.
- Signage must be consistent and uniform, but should also respond to its surroundings, allowing a user to identify different frontages. The signage will be detailed as part of the Reserved Matters Application.
- The wayfinding must integrate into other elements where appropriate, such as with public art. Visibility is a key part of a wayfinding strategy, as such, open space design must ensure that important landmarks are visible at key decision making locations.

Secondary Board

3.11 PUBLIC ART

Public art provision within KP4 will relate to the interpretation of existing heritage features and animation of the public realm.

MANDATORY PRINCIPLES

- Public art will be considered primarily within the design of the landscape and public spaces and opportunities may include:
- Landscape: creating features within the Green Infrastructure through planting, landforms, signage (including locating past heritage features) and street furniture.
- Pocket Parks: designed to create added visual and tactile interest.
- Key Buildings: It may be possible to integrate features into the detailed building design – for instance providing heritage references on new buildings that are located on, or close to, the location of the site specific heritage features that are to be removed (e.g. A Station / radio masts).

Tertiary Board

3.12 PLANTING PALETTE/STRATEGY

The layout of the streets and residential parcels provides the opportunity to create a strong network of street tree planting. The following pages provide an overview of the proposed strategy in which the following mandatory principles will apply:

Street Trees

- Tree stock is to be of predominantly native species although some non-native stock will be used to provide aesthetic/seasonal interest or respond to specific design requirements.
- Sizes at implementation will range from mature stock to smaller 'Standard' size trees in private gardens. Tree stock must be specified as appropriate to their setting - balancing considerations of implementation, establishment and resistance to damage or vandalism.
- Trees are to be planted in appropriately sized pits with structural soils specified where required. Root barriers will be required to safeguard services and foundations in some areas.
- Planting within streets will employ, as required, an engineered tree pit solution to expand rooting space and ensure optimum growth conditions whilst supporting traffic loads, accommodating adjacent utilities and managing storm water on site.

Informal Open Space & Wildlife Corridors

The informal spaces are generally focused on habitat creation measures - specifically through new planting that will create a mosaic of wooded areas, hedgerow, scrub and wildflower grassland. Planting in these areas will include:

GRASSLAND:

- Species-rich grassland will be provided throughout the informal spaces as overseeding or as newly sown for areas that require re-profiling or reinstatement.
- Mixes including Emorsgate Seeds EM2 will be suitable and must include herbaceous species such as Yellow Rattle, Common Bird's-foot Trefoil, Common Knapweed, Oxeye Daisy and Red Clover. Wet meadow grassland in areas surrounding the new ponds will also be established using Emorsgate Seeds EM8 or similar.

TREES:

Tree planting will be of primarily native stock, appropriate to the site and context. Species may include some of the streetscape palette as well as the following core species:

- Acer campestre
- Alnus glutinosa
- Betula pubescens
- Prunus avium
- Quercus robur
- Salix alba
- Salix fragilis
- Sorbus aucuparia
- Tilia x europea 'Pallida'

SCRUB AND SHRUB PLANTING:

Composition will include native species that are of known value to wildlife such as Blackthorn, Holly, Hawthorn, Field Maple, Guelder-rose, Dogwood etc. Thorny species such as Blackthorn and Holly in areas adjacent to the newt ponds will help prevent disturbance and restrict access.

HEDGEROW PLANTING:

Existing hedgerows are to be retained where possible with gapping up and reinforcement as required. Significant new hedgerow planting is to be undertaken to enclose and link the habitats and provide structure to the open spaces.

STRUCTURAL PLANTING:

Some focused areas of woodland style mixes will be planted to reinforce hedgerows, provide screening and shelter and dense habitat within informal landscape areas.

PRIVATE AND SEMI-PRIVATE SPACES

The way in which private gardens and semi-private parking courts etc, are treated is central to the biodiversity and planting strategy:

- Significant areas of varied habitat will be established throughout the development by clustering gardens and courtyard planting.
- Shrub and other planting stock will be partly (at least 30%) drawn from a palette of native species and specifically include plants that have interest for local fauna.
- Planting may also include more ornamental, non-native stock as appropriate to the context.

SPECIES AND CULTIVAR	COMMON NAME	GIRTH (CM)	HEIGHT (CM)	NOTES
Primary Streets - Avenue Tree Planting				
Corylus colurna	Turkish Hazel	30-35	600-650	
Platanux X hispanica	London Plane	30-35	600-650	
Tila cordata 'Greenspire'	Small-leaved Lime	30-35	600-650	
Secondary and Tertiary Streets - Informal Tree Spacing				
Alnus incana 'Aurea'	Golden Alder	20-25	Min 500	
Prunus avium 'Plena'	White Flowering Cherry	20-25	500-550	
Prunus sargentii 'Rancho'	Cherry	20-25	500-550	
Pyrus calleryana 'Chanticleer'	Ornamental Pear	20-25	500-550	
Ulmus 'New Horizon'	Elm	20-25	500-550	
Parkland and Formal Open Space				
Alnus incana 'Aurea'	Golden Alder	20-25	Min 500	
Betula pendula 'Tristris'	Weeping Birch	20-25	Min 450	
Corylus colurna	Turkish Hazel	20-25	500-550	
Fagus sylvatica	Common Beech	25-30	500-550	
Quercus Petraea	Sessile Oak	20-25	500-550	
Quercus robur	Common Oak	20-25	500-550	
Tilia cordata	Small-leaved Lime	30-35	600-650	
Tilia x europea 'Pallida'	Small-leaved Lime	30-35	600-650	
Informal Open Space and Pocket Parks				
Acer campestre	Common Maple	16-18	400-450	
Alnus glutionosa	Common Alder	12-14	350-425	
Betula pubescens	Downy Birch	10-12	300-350	
Carpinus betulus	Common Hornbeam	16-18	400-450	
Prunus avium	Wild Cherry	16-18	400-450	
Quercus robur	Common Oak	16-18	400-450	
Salix alba	White Willow	10-12	300-350	
Salix fragilis	Crack Willow	10-12	400-450	
Sorbus aucuparia	Rowan	12-14	350-425	
Sorbus tominalis	Service Tree	12-14	350-425	
Ulmus 'New Horizon'	Elm	16-18	400-450	
Fruit Trees to Orchard Areas				
Malus	Apple		Min 200	2 year old straight lead
Prunus insititia	Damson		Min 200	2 year old straight lead
Pyrus	Pear		Min 200	2 year old straight lead
Back Gardens				
Acer campestre	Common Maple	10-12	300-350	Small garden trees to be supplied at standard size with a 1.75m min clear stem
Carpinus betulus	Hornbeam	10-12	300-350	
Prunus avium	Wild Cherry	10-12	300-350	

Figure 3.14 Tree Planting - Outline Palette of Typical Species

3.13 TREES AND HEDGEROWS

Throughout KP4, wherever possible, existing hedgerows, trees and significant vegetation will be retained where it does not clash with areas required for crucial infrastructure or residential parcel works.

Where possible existing hedgerows are and trees to be incorporated into the KP4 open space proposals and retained/replenished and reinforced.
Some of the existing hedgerows and trees are scheduled for removal however, as retention is not compatible with the master plan design of streets, spaces and development parcels.

To offset the loss of these hedgerows and trees considerable new hedgerow planting is proposed in mitigation, as was the case for KP1, KP2 and KP3. Figures 3.14 and 3.15 opposite set out the existing and proposed hedgerows in the context of KP4.

MANDATORY DESIGN PRINCIPLES:

- Target a 10% increase in the amount of hedgerow and trees in KP4 as part of the overall Green Infrastructure design.
- Provide new hedgerow planting to define the edges of the wildlife corridors and provide a connective habitat element.
- Retaining existing hedgerows and trees where possible.
- Indicative figures are provided on the plan opposite to give and overview of the length of existing, retained and proposed hedgerows within KP4. It should be noted that these figures preceded detailed design of many of the key areas and will inevitably be subject to change but provision within the approved wildlife corridor scheme alone is well in excess of the target figure for KP4.

Figure 3.15: Existing Key Phase 2 Hedgerow

Figure 3.16: Example of retained Hedgerow within Key Phase 1 proposals

EXISTING HEDGEROWS

- Approximately 2,239m existing hedgerow within KP4 boundary
- (110% = 3,246m)

Figure 3.17: KP4 Existing Hedgerows

PROPOSED HEDGEROWS

- Approximately 1,787m retained / replenished existing hedgerow
- Approximately 946m proposed new hedgerow
- Total: 2,733m hedgerow
- The proposed strategy provides more than 110% of existing hedgerows within KP1

Figure 3.18: KP4 Retained Existing and Proposed New Hedgerows

3.14 LIGHTING

The lighting proposals are to be prepared with due reference to the 'Rugby Radio Station Lighting Strategy' (August 2013) prepared by Roger Griffiths Associates.

The five overall principles for the lighting strategy are:

- Principle 1: promote safe and efficient movement around the site during night time conditions.
- Principle 2: ensure all lighting specified is essential, appropriate and has mitigation in place where necessary.
- Principle 3: take precautionary and sensitive measures where wildlife is present and utilise low heat output lights, minimum spread lamps and downward pointing lights.
- Principle 4: optimise energy use through energy efficient luminaries, dimmed and timed systems, recyclable products, re-use of components at the end of their life and renewable energy as a power source where possible.
- Principle 5: create an uncluttered landscape with a sensitive approach to the landscape character of the site whilst utilising best practice for lighting design.

The following mandatory principles apply for the location, positioning and types of lighting to be provided:

MANDATORY PRINCIPLES

- Roads and streets will be lit using column mounted luminaries. In some cases, it may be possible to use wall/ building mounted luminaries (subject to WCC agreement) to help reduce street furniture within the pedestrian corridors.
- Private and semi-private courtyards, shared surface links and mews areas will be lit using the same family of column lighting as for streets and wall/building mounted luminaries where possible to minimise clutter in restricted spaces.
- Positioning of lighting units will require careful consideration alongside the landscape proposals to avoid being obscured by tree planting and other features.
- Commercial facades, notably along main streets, may benefit from additional wall mounted bulkhead lighting and/or feature lighting to highlight frontages.
- Formal and Civic public open spaces will utilise a mix of column lighting (to provide safe illumination along key routes) and feature lighting elements (uplighters, in ground spots etc) to highlight key features and add day-round interest and animation.
- Informal open spaces - with special reference to habitat corridors - will utilise low level bollard lighting with carefully directed light outputs onto paths only to ensure habitats are not affected and create dark corridors for foraging bats. Other areas of informal open space where there are no pedestrian pathways will not be lit.

Note: alternative designs may be appropriate if agreed with WCC Highways.

Descriptions of light fittings:

COLUMN LIGHTING

- Columns to be finished in black to reduce their visibility in the night time environment.
- Column heights should be at minimum heights and maximum spacing to fulfil their function.
- The luminaire fitting should be a design which reduces light spill and glare, with the minimum wattage required for safety purposes.
- The finish of columns where they are situated within publicly maintainable highway should be agreed in writing with the Highway Authority.

BOLLARD LIGHTING

- Bollards to be finished in a dark colour and complementary in design to the columns chosen. They should be of the minimum wattage required, at maximum spacings and with a shielded light source.

IN-GROUND LIGHTING

- Should also be finished in a dark colour and be complementary in design to the other products used. The in-ground light should be shielded in order to avoid upward light spill.

Precedent images from KP1

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Chapter 4

Movement & Access

4.1 MOVEMENT & ACCESS

The Guiding Design Principles for Movement and Access collectively seek to create a network of safe and secure streets forming walkable neighbourhoods.

A significant amount of infrastructure has been delivered ahead of defining KP4, including the Central Primary Street (CPS) and the secondary school loop road, both of which are included within KP4. Therefore the highways that are likely to be brought forward through reserved matters applications will be the secondary street and tertiary streets associated with residential development.

The following Mandatory Design Principles for KP4 Movement and Access are set out below:

MANDATORY DESIGN PRINCIPLES

- To establish a safe and legible network of streets and pedestrian/cycleways.
- To provide a coherent hierarchy of streets consisting of secondary and tertiary streets to support the existing primary street network.
- To ensure appropriate provision is made to connect KP4 to the existing and planned pedestrian and cycling networks and bus services which link to Rugby town centre and DIRFT I, II and III.
- To prioritise the movement and safety of pedestrians and cyclists through the provision of safe and direct routes.
- To deliver the appropriate level of vehicular and cycle parking but to ensure it does not dominate the built environment.
- To design carriageways to the appropriate standards and incorporate speed restraint and clear signage measures where necessary.

Figure 4.1 uses an extract from the Regulatory Plan to demonstrate how the above principles could be applied. The secondary and tertiary street alignments, minor access points and cross parcel permeability shown on this plan are indicative only. Developers will be required to design layouts which are permeable and include horizontal alignments and speed restraint measures which achieve the required design speed and are acceptable to WCC Highways. As such, housebuilders are encouraged to seek pre-application advice with WCC / RBC early in the design process.

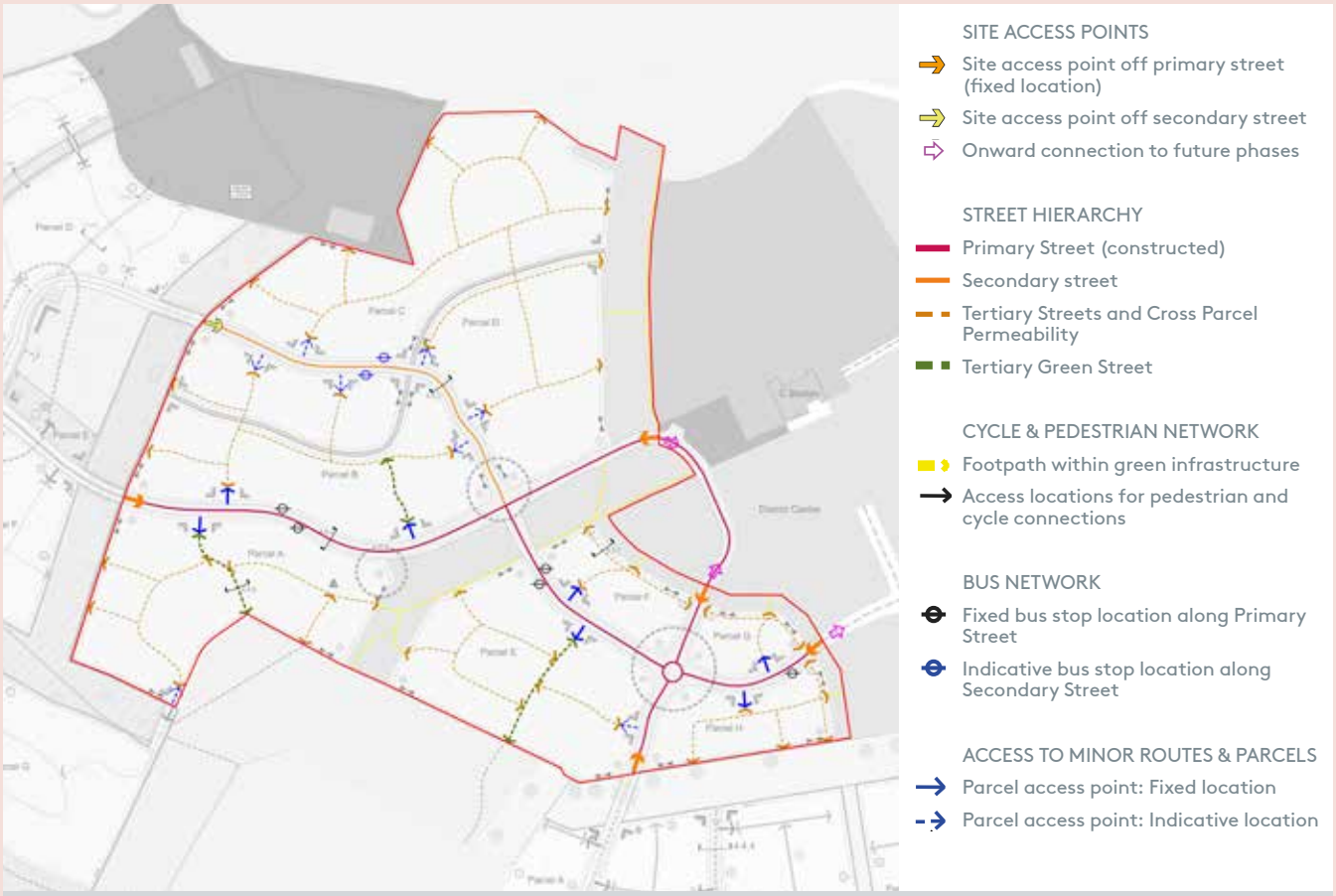


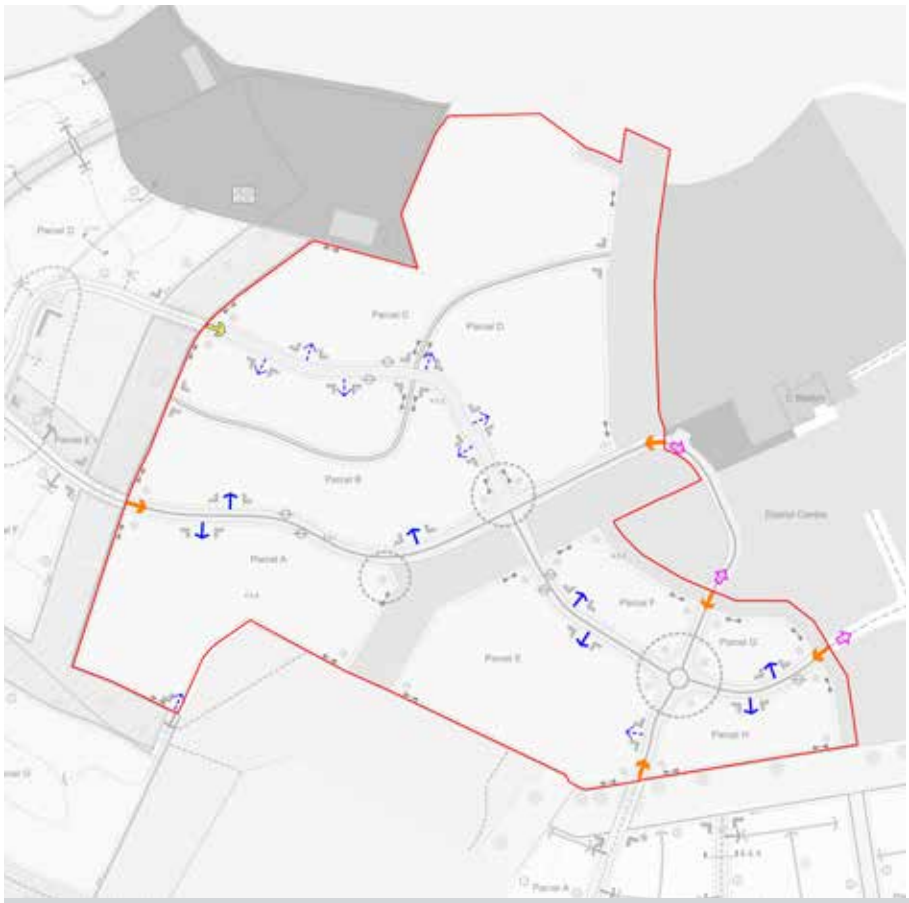
Figure 4.1: Movement and Access: Extract from the Regulatory Plan

4.2 ACCESS POINTS

Points of vehicular access in to KP4 are illustrated on the Regulatory Plan and Figure 4.2. These points of access have already been constructed as part of the CPS and loop road, notwithstanding this the following mandatory principles should be followed:

MANDATORY DESIGN PRINCIPLES

- The Central Primary Street runs east-west through the centre of KP4 towards the District Centre. Other Primary Streets including a connection between the District Centre and KP2 and route from the Central Primary Street to become part of a route around the southern edge of the District Centre to serve the Secondary School. This part of the Central Primary Street has been constructed.
- A secondary street will provide access to development parcels in the north of the Central Primary Street in KP4 and provide an onward connection to KP3 and the primary school.
- Eight priority access junctions on the Central Primary Street will serve tertiary streets providing access to residential development parcels. Seven of these junctions have reserved matters approval via the Central Primary Street Grey Infrastructure RMA.
- Five priority access junctions will serve tertiary streets from the Secondary Street.
- An tertiary street connection will be provided at the southern edge of KP4 to tie northern edge of KP3 adjacent to Normandy Hill and along the former access road to A Station.



SITE ACCESS POINTS

- Site access point off primary street (fixed location)
- Site access point off secondary street
- Onward connection to future phases

ACCESS TO MINOR ROUTES & PARCELS

- Parcel access point: Fixed location
- Parcel access point: Indicative location

Figure 4.2: Site Access Plan

4.3 CYCLING & PEDESTRIAN NETWORK

A comprehensive network of routes for pedestrians and cyclists must be provided to facilitate ease of movement by walking and cycling, both as part of the street design and as separate leisure routes through green infrastructure.

Primary and secondary streets will have footways along one side and dedicated footway/cycle way along the other to accommodate cyclists. Lower order tertiary streets will have sufficient width to accommodate vehicles and cycles on the carriageway. The following mandatory principles apply to cyclist / pedestrian provision as part of streets:

MANDATORY DESIGN PRINCIPLES

- Pedestrian footways will be provided adjacent to all of the roads at a minimum width of 2m, with wider footways in areas of high pedestrian volumes.
- Pedestrian footpaths will be constructed between individual development plots to encourage walking as a meaningful mode of transport.
- Footpaths and cycleways will be constructed along key desire routes between land uses to ensure that walking and cycling are considered as a real choice.
- Pedestrians and cyclists will be given priority wherever possible over all other forms of traffic with crossing facilities taking the form of signalised crossings, Zebra crossings or shared surfaces depending on the location and volumes.
- Cycleways will be provided either as shared facilities with pedestrians (at a minimum width of 3m) or as dedicated facilities.
- Cycle parking will be provided in key locations in accordance with minimum standards as set out in relevant RBC policy guidance. Cycle parking will also be provided within public areas for general use and within individual plots as these are developed out.
- Developers of individual plots will submit details with Reserved Matters planning applications identifying the numbers and locations of cycle parking along with links to walking and cycling facilities.
- Careful location of crossing points and cycleways to achieve effective and safe connectivity.

The Regulatory Plan illustrates suggested routes for leisure paths for walking and cycling through the network of green infrastructure. These off-road leisure routes connect with the comprehensive network of connected streets which make provision for walking and cycling. This network of leisure routes (footpaths, cycle tracks) provide access for pedestrians and cyclists through green infrastructure and should be designed in accordance with the following mandatory design principles:

MANDATORY DESIGN PRINCIPLES

- Surface: bituminous surface, bonded gravel or self binding gravel.
- Edging: Concrete or timber edging.

The combination of off-road leisure routes and streets are illustrated in Figure 4.3: Indicative Walking and Cycling Network.

Figure 4.3: Indicative Walking and Cycling Network

4.4 BUS NETWORK

The overall strategy envisages the introduction of new routes through the site connecting the key phases, District Centre and beyond RSR to DIRFT and Hillmorton along with Rugby town centre and railway station.

New buses will be introduced, primarily to link the site with Hillmorton and beyond to Rugby town centre via the link road and CPS. The exact details of these routes will be proposed and agreed by the Transport Review Group (TRG) in conjunction with the bus operators. The strategy will detail the key principles of public transport provision at the site whilst retaining sufficient flexibility to react to site specific demands and take account of opportunities to serve nearby areas and maximise patronage levels.

Bus provision will be delivered within the constraints of the overarching bus strategy to ensure that planning obligations are met. However, the routing and frequency of services along with size of buses will be reviewed on an ongoing basis throughout the build programme with the aim of ensuring that the bus service provision meets the needs of the development.

MANDATORY DESIGN PRINCIPLES

- The public transport measures will be reviewed on an ongoing basis throughout the build programme with changes made as and when necessary.
- Bus stop locations will be located at key locations throughout the wider Development Site with the objective that no individual plot should be more than 400m from a bus stop in line with the Site Wide Travel Plan.
- Bus stops will be retained on the CPS in accordance with the reserved matters approval for the CPS.
- Two bus stops will be provided on the secondary street to tie in with the wider bus network.
- The stops will be constructed to be accessible and will include shelters to the appropriate standard.

See Figure 4.4, below illustrating existing and new bus stops within a 400m walking distance radii at the site entrance and possible future stops (lighter shade) within a 400m / 5 minute walking distance radii.

Figure 4.4: Indicative future bus routes

4.5 STREET HIERARCHY

KP4 is designed to provide a well-connected network of streets of different character within the site. Variety in character and degree of enclosure of streets will be key to ensuring legibility and identity. Streets, in combination with green infrastructure, provide the framework for development parcels within KP4. The streets are arranged to facilitate ease of movement and access into development plots and parcels and these streets are ordered in a hierarchy, as illustrated in Figure 4.5.

The role and function of individual streets will differ depending upon their position within the development and the areas which they transect. The street type is integral to the character of the surrounding built form which will reflect the level that the particular street holds in the hierarchy and its significance within the SUE. This has a direct impact on the level and type of traffic that the street will accommodate and has influenced the design criteria of the different types of route.

There are five main street types within the street hierarchy. To ensure that the character of the street responds appropriately to the adjacent land uses, tertiary streets have been sub-divided into three categories to enable a tailored response to either built development.

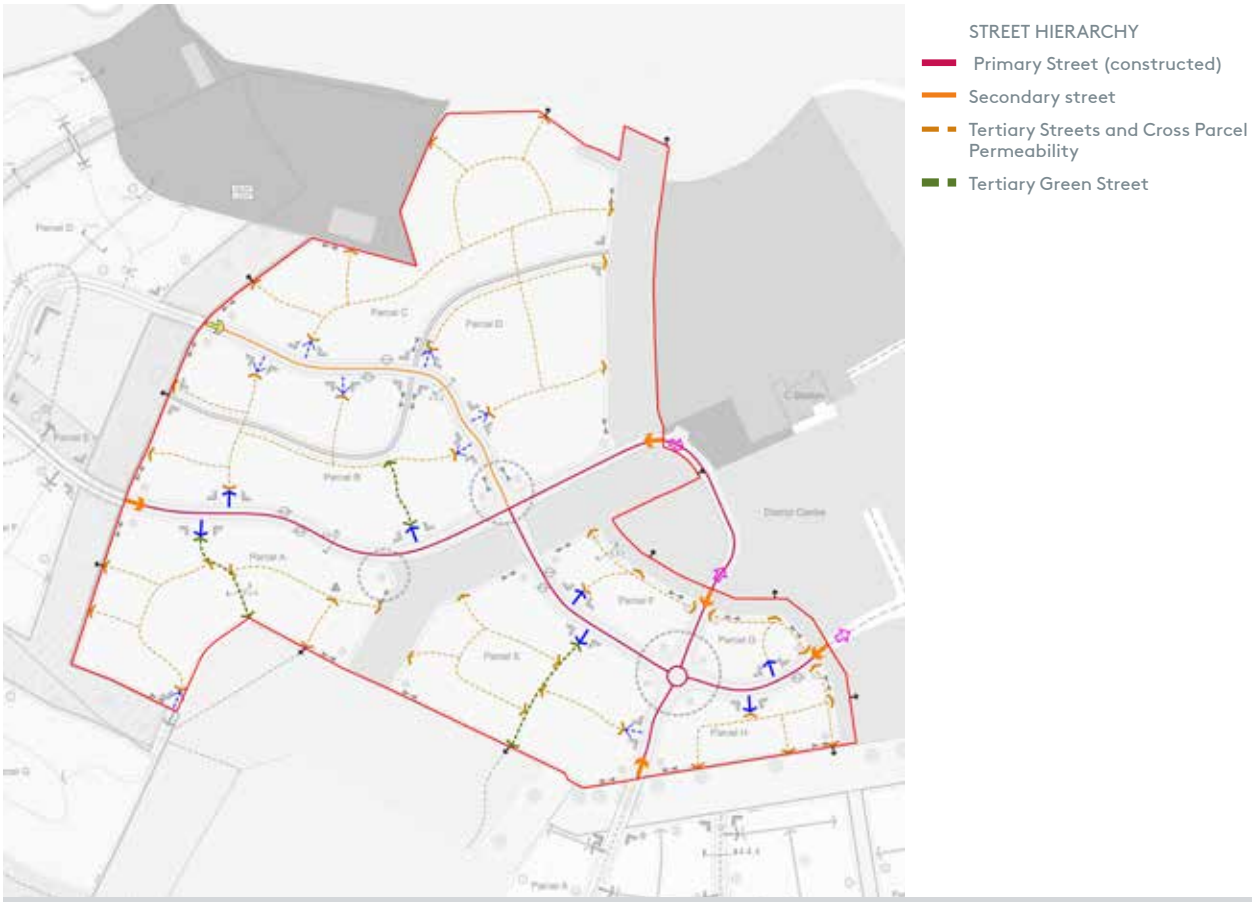


Figure 4.5: Street Hierarchy Plan

1. Primary Streets (already constructed)

- Highest order streets providing the main connection through KP4 to adjacent phases including KP3 and the District Centre;
- To include dedicated cycle and footpaths alongside one side and accommodate bus routes. This is a public transport route;
- Lined with street trees and wide grass verges.

2. Secondary Streets

- Function as distributor routes also providing access to homes – in KP4 this includes parcels to the north of the Central Primary Street
- As a bus route, access to dwellings will be achieved with shared private drives that will serve a maximum of six dwellings;
- To include dedicated shared cycle and footpaths alongside one side;
- To accommodate tree planting, grass verges, and footpaths where appropriate;
- Accommodate a bus route with carefully placed bus stops that avoid locations immediately outside the frontage of a dwelling.

3. Tertiary Streets

- Provide cross-parcel permeability through development parcels and access to dwellings;
- Are accessed from primary and secondary streets;
- Typically only used by those living or visiting that parcel;
- Are narrower and less formal in character than the higher order streets;
- Could contain street trees and areas of on-street parking;
- Must include speed restraint measures which achieve a 20mph design speed and increase safety for pedestrians and cyclists;
- Can include dropped kerbs and no road markings to reduce speeds and promote pedestrian priority;
- Five options for tertiary street types:
  - Standard (Option 1);
  - Less formal with less vertical separation (Option 2);
  - Less formal but more enclosed with continuous development (Option 3);
  - Next to landscape and open space; and
  - Form part of green corridors.

4. Tertiary Streets as Spaces

- Further guidance provided for areas of public realm where tertiary streets have the opportunity to wrap around small public spaces (for instance pocket parks or formal parks);
- In these instances, the design of the streets around spaces can widen the area of usable public space and help manage speed through the use of horizontal changes design features.

5. Shared Private Drives

- The lowest order streets providing access for up to a maximum of six dwellings;
- Not through routes;
- Opportunity to use different surfacing treatments including bonded gravel, stone / block paving and setts; and
- Need to consider appropriate bin collection locations which must be located within the private driveway.

Design guidance for each street type is provided in the tables presented on the following pages. These street type tables provide design details, technical requirements, and accompanying street section drawings that illustrate the form of the street. The specifications have been developed to be broadly consistent with KP1, KP2 and KP3 whilst incorporating best practice and lessons learnt from earlier phases through discussions with the Highway Authority.

The detailed design of new streets in KP4 will be the subject of Reserved Matters Approvals and Section 38 approvals which will require a Road Safety Audit of the proposed layout. It is recommended that early engagement is sought with WCC Highways to ensure that vehicle speeds are appropriately controlled and contained through design of the street.

Note regarding refuse and emergency vehicles:

Turning areas will be provided as appropriate for refuse and emergency vehicles, some turning heads will be temporary interim measures, awaiting future connections towards other parts of the wider RSR site.

4.5.1 STREET HIERARCHY: PRIMARY STREETS (CONSTRUCTED)

GENERAL INFORMATION / MANDATORY PRINCIPLES	
STREET TYPE	PRIMARY
LOCATION	Core Primary Street from KP3 east through the site to the District Centre. Other Primary Streets include between KP2 through KP4 to the District Centre and around the south of the District Centre.
CHARACTER	Formal in character, the widest street corridor
DIRECT ACCESS TO HOMES?	Limited direct access in selected locations
STREET DESIGN	
TOTAL CORRIDOR WIDTH	15.9 – 20.7m
FOOTPATHS	3m shared footway/cycleway on one side, 2m the other side
CYCLEWAYS	3m shared footway/cycleway on one side
CARRIAGEWAYS	6.7m
PUBLIC TRANSPORT ROUTE	Yes
TRAFFIC CALMING	Design speed to primarily be achieved through horizontal alignment. To be complemented, as required, with speed restraint measures, including pedestrian refuges and horizontal shifts in carriageway, spaced at 60-70m intervals.
UTILITIES CORRIDOR	Yes, as per section 5.18: • Sewers under Carriageway • Other utilities under footway
SURFACE FINISHES	• Blacktop asphalt as standard. • Other bound aggregate surfaces and stone/concrete paving finishes at points of interface with key Public Open Spaces.
STREET FURNITURE	• Bench seating and litter bins provided at strategic 'resting points' and coordinated with adjacent public open spaces where possible. • Provision of dog waste bins subject to LPA requirements.
STREET LIGHTING	• Street lighting to WCC specification. • Lantern type Urbis Axa.
ON-STREET PARKING	No
TECHNICAL DETAILS	
DESIGN SPEED	30mph
ROAD MARKINGS	Centreline, give way and raised table markings
JUNCTION SPACING (CENTRELINE-CENTRELINE)	30m
JUNCTION RADII	8-15m
FORWARD VISIBILITY	43m
VISIBILITY SPLAYS	43m
CENTRELINE RADII	12.7 – 21.7m
STREET LANDSCAPING	
VERGE WIDTH	2.1 – 4.5m
STREET TREES	Planted within landscaped verge.
PLANTING PALETTE	General varieties that do not restrict visibility.
SUDS	Not applicable.

Figure 4.6: Primary Street locations

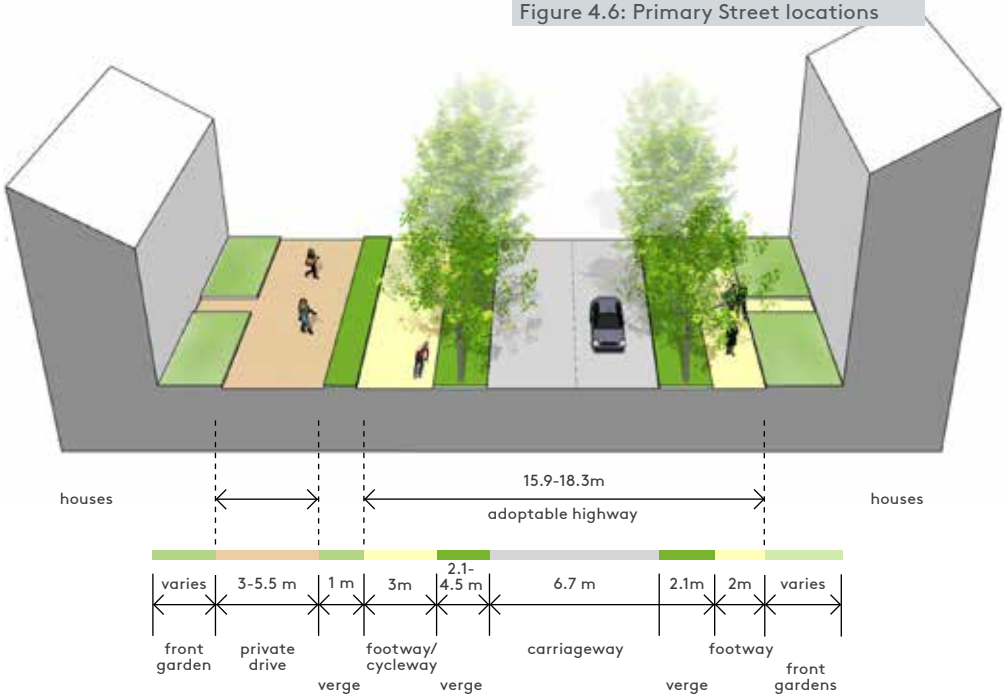


Figure 4.7: Primary Street Indicative Section

4.5.2 STREET HIERARCHY: SECONDARY STREETS

GENERAL INFORMATION / MANDATORY PRINCIPLES	
STREET TYPE	SECONDARY
LOCATION	One route from Central Primary Street through parcels in north of KP4 towards KP3.
CHARACTER	Neighbourhood distributor routes providing direct access to homes and tertiary streets.
DIRECT ACCESS TO HOMES?	Yes if it can be demonstrated that measures to reduce on-street parking are taken into consideration and only if highway safety isn't compromised.
STREET DESIGN	
TOTAL CORRIDOR WIDTH	13 – 15m (13.4 – 15.4m where PT route).
FOOTPATHS	3m shared footway/cycleway on one side, 2m other side.
CYCLEWAYS	3m shared footway/cycleway on one side.
CARRIAGEWAYS	6.1m (to accommodate a bus route).
PUBLIC TRANSPORT ROUTE	Selected routes of 6.1m wide but no on-street parking.
TRAFFIC CALMING	Yes, spaced at approx. 70m intervals.
UTILITIES CORRIDOR	Yes, as per section 5.18: • Sewers under carriageway. • Other utilities under footway.
SURFACE FINISHES	• Blacktop asphalt. • Other bound aggregates and stone/ concrete paving finishes at points of interface with key Public Open Spaces.
STREET FURNITURE	• Bench seating and litter bins provided at strategic 'resting points' and coordinated with adjacent public open spaces where possible. • Provision of dog waste bins subject to LPA requirements
STREET LIGHTING	• Street lighting to WCC specification. • Lighting type Axa.
ON-STREET PARKING	No.
TECHNICAL DETAILS	
DESIGN SPEED	30mph (as a bus route)
ROAD MARKINGS	Centreline, give way and raised table markings.
JUNCTION SPACING (CENTRELINE-CENTRELINE)	30m
JUNCTION RADII	8m
FORWARD VISIBILITY	43m
VISIBILITY SPLAYS	43m
CENTRELINE RADII	12 – 14m
STREET LANDSCAPING	
VERGE WIDTH	2.1 – 2.5m
STREET TREES	Planted within landscape verge.
PLANTING PALETTE	General varieties that do not restrict visibility.
SUDS	No applicable.

Figure 4.8: Secondary Street locations

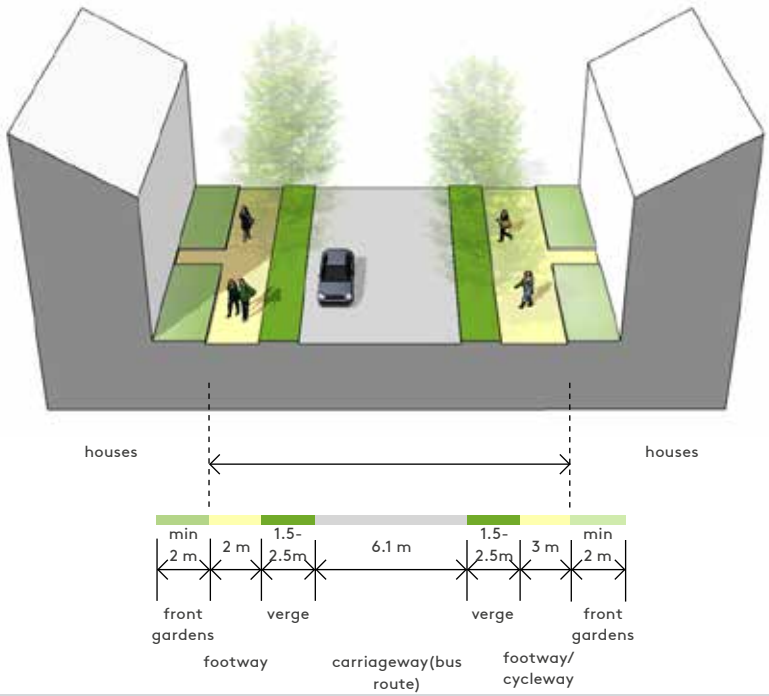


Figure 4.9: Secondary Street Indicative Section

4.5.3 CROSS PARCEL PERMEABILITY & TERTIARY STREETS

MANDATORY DESIGN PRINCIPLES

- Individual development parcels will provide cross-parcel permeability mainly through a network of tertiary streets and pedestrian/ cycle routes to create a legible block structure.
- Key cross parcel connections are identified on the Regulatory Plan and will be delivered as part of this network.
- The alignment and design of the tertiary streets will be fixed by future Reserved Matters Applications.
- Indicative access points to parcels, which will likely connect to tertiary streets, are illustrated on the Regulatory Plan. The alignment and design of the tertiary streets will be fixed by future Reserved Matters Applications (early engagement with WCC is recommended to agree proposed alignments)
- Tertiary streets provide cross-parcel permeability through development parcels and access to dwellings.
- Typically, tertiary streets will only be used by people living or visiting that area and will therefore be narrower and less formal in character than secondary streets.
- Longer tertiary streets should be provided with trees on at least one side and could contain areas of on-street visitor parking. The location of street trees must avoid visibility spay from junctions, driveway and other access points.
- They must be designed to include horizontal alignments which encourage lower vehicle speeds. This can be complemented with speed restraint features, as required, to increase safety for pedestrians and cyclists.
- Detailed proposals will be expected to utilise more than one of the five Tertiary Street types within layouts.

There are five options for tertiary street types with guidance for each provided as follows:

- Tertiary Standard Streets (Option 1) with standard highway design – see Design Principles for this street type in Section 4.5.4;
- Tertiary Standard Streets (Option 2) which are less formal with less vertical separation between carriageways and pavements – see Design Principles for this street type in Section 4.5.5.
- Tertiary Standard Streets (Option 3) which are less formal and enclosed with continuous development – see Design Principles for this street type in Section 4.5.6
- Tertiary Streets next to landscape and open space – see Design Principles for this street type in Section 4.5.7;
- Tertiary Green Streets, that form part of a linear Green Corridor – see Design Principles for this street type in Section 4.5.8.

Tertiary Streets as Spaces

In addition to the four tertiary street type options there is further guidance for tertiary streets as spaces – where tertiary streets have the opportunity to wrap around small public spaces (for instance pocket parks or formal parks). – see Design Principles for this street type in section 4.5.9.

Shared Private Drives

The lowest order level of street is private drives, used to access a small number of dwellings (to be determined at reserved matters Stage). – see Design Principles for this street type in section 4.5.10.

4.5.4 STREET HIERARCHY: TERTIARY STREET (OPTION 1)

GENERAL INFORMATION	
STREET TYPE	TERTIARY STREET: (OPTION 1)
LOCATION	Access to residential development parcels.
CHARACTER	Smaller scale residential streets providing access to homes.
DIRECT ACCESS TO HOMES?	Yes.
STREET DESIGN	
TOTAL CORRIDOR WIDTH	9.5m (less can be agreed on a case by case basis).
FOOTPATHS	2m both sides (unless as agreed as a consequence of layout).
CYCLEWAYS	No.
CARRIAGEWAYS	5 – 5.5m.
PUBLIC TRANSPORT ROUTE	No.
TRAFFIC CALMING	Design speed to primarily be achieved through horizontal features. To be complemented with speed restraint measures at 60-70m intervals.
UTILITIES CORRIDOR	Yes, as per section 5.18: • Sewers under carriageway. • Other utilities under footway.
SURFACE FINISHES	Bituminous surface and concrete edging / concrete block / stone sett paving /block paving.
STREET FURNITURE	None (will be provided in Public Open Space if required.
STREET LIGHTING	• Street lighting to WCC specification. • Lantern type Urbis Axa.
ON-STREET PARKING	Potential provision for on-street visitor parking, to be confirmed at the Reserved Matters Application stage in detailed design.
TECHNICAL DETAILS	
DESIGN SPEED	20mph.
ROAD MARKINGS	May be required dependant on layout.
JUNCTION SPACING (CENTRELINE-CENTRELINE)	30m.
JUNCTION RADII	8m.
FORWARD VISIBILITY	25m.
VISIBILITY SPLAYS	25m.
CENTRELINE RADII	13 – 13.5m
STREET LANDSCAPING	
VERGE WIDTH	1 – 1.5m (2.0m will be required where utilities are to be laid).
STREET TREES	No.
PLANTING PALETTE	N/A.
SUDS	To be determined within detailed design.

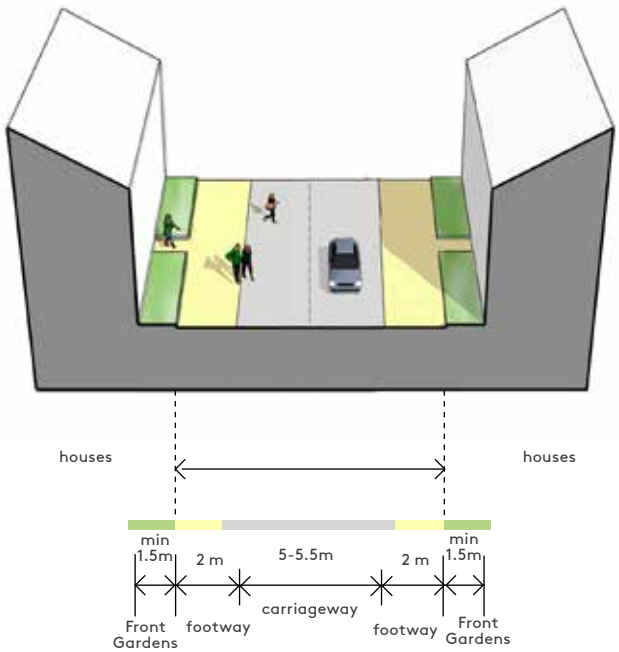


Figure 4.10: Tertiary Street (Option 1) Indicative Section

4.5.5 STREET HIERARCHY: TERTIARY STREET (OPTION 2)

GENERAL INFORMATION	
STREET TYPE	TERTIARY STREET: (OPTION 2)
LOCATION	Within residential development parcels.
CHARACTER	Less formal than tertiary street option 1, it shows less vertical separation between carriageways and footpaths (defined with dropped kerb). Street layout also suitable for roads bounding informal green spaces within the residential parcels. Lower kerb heights are considered acceptable.
DIRECT ACCESS TO HOMES?	Yes.
STREET DESIGN	
TOTAL CORRIDOR WIDTH	9m (if adopted).
FOOTPATHS	2.0m both sides.
CYCLEWAYS	No.
CARRIAGEWAYS	5m.
PUBLIC TRANSPORT ROUTE	No.
TRAFFIC CALMING	Design speed to primarily be achieved through horizontal features. To be complemented with speed restraint measures at 60-70m intervals.
UTILITIES CORRIDOR	Yes.
SURFACE FINISHES	• Surfaced dressed tarmac to standard carriageway treatment. • Block paving to define pedestrian refuges and crossing points.
STREET FURNITURE	None (will be provided in pocket parks if relevant).
STREET LIGHTING	• Street lighting to WCC specification. • Lantern Type Urbis Axa.
ON-STREET PARKING	Potential provision for on-street parking, to be confirmed at Reserved Matters Application stage.
TECHNICAL DETAILS	
DESIGN SPEED	20mph.
ROAD MARKINGS	No.
JUNCTION SPACING (CENTRELINE-CENTRELINE)	30m.
JUNCTION RADII	8m.
FORWARD VISIBILITY	25m.
VISIBILITY SPLAYS	25m.
CENTRELINE RADII	13m.
STREET LANDSCAPING	
VERGE WIDTH	0m.
STREET TREES	No.
PLANTING PALETTE	N/A.
SUDS	To be determined within detailed design.

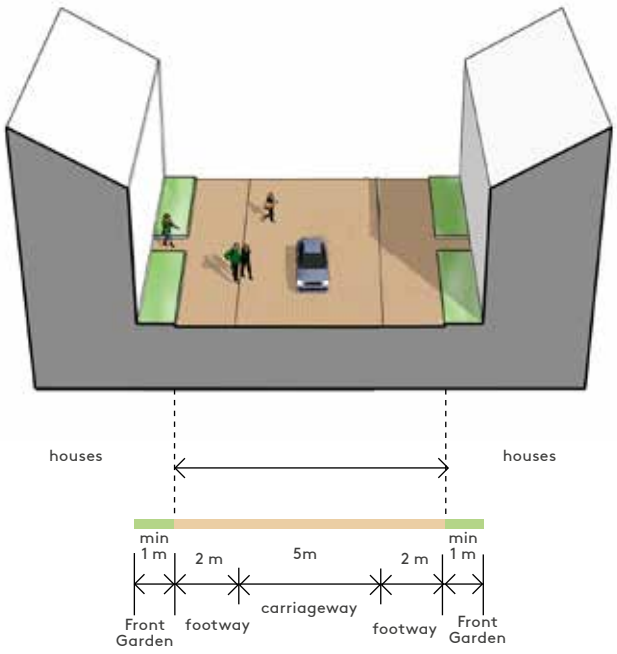


Figure 4.11: Tertiary Street (Option 2) Indicative Section

4.5.6 STREET HIERARCHY: TERTIARY STREET (OPTION 3)

GENERAL INFORMATION	
STREET TYPE	TERTIARY STREET (OPTION 3)
LOCATION	Within higher density residential development parcels.
CHARACTER	Similar to tertiary street Option 2, it shows less vertical separation between carriageways and footpaths, using lower height kerbs. It aims to achieve a more enclosed streetscene by continuous development frontage, set back by up to 2m from the adopted street boundary. Street layout suitable for Mews Streets, where the defensible space is intended to be a continuation of the street hardscape. Lower kerb heights are considered acceptable.
DIRECT ACCESS TO HOMES?	Yes.
STREET DESIGN	
TOTAL CORRIDOR WIDTH	9m (if adopted).
FOOTPATHS	2.0m both sides.
CYCLEWAYS	No.
CARRIAGEWAYS	5m.
PUBLIC TRANSPORT ROUTE	No.
TRAFFIC CALMING	Design speed to primarily be achieved through horizontal features. To be complemented with speed restraint measures at 60-70m intervals.
UTILITIES CORRIDOR	Yes.
SURFACE FINISHES	• Block paved
STREET FURNITURE	None (will be provided in pocket parks if relevant).
STREET LIGHTING	• Street lighting to WCC specification. • Lantern Type Urbis Axa.
ON-STREET PARKING	Potential provision for on-street parking, to be confirmed at Reserved Matters Application stage.
TECHNICAL DETAILS	
DESIGN SPEED	20mph.
ROAD MARKINGS	No.
JUNCTION SPACING (CENTRELINE-CENTRELINE)	30m.
JUNCTION RADII	8m.
FORWARD VISIBILITY	25m.
VISIBILITY SPLAYS	25m.
CENTRELINE RADII	13m.
STREET LANDSCAPING	
VERGE WIDTH	0m.
STREET TREES	No.
PLANTING PALETTE	N/A.
SUDS	To be determined within detailed design.

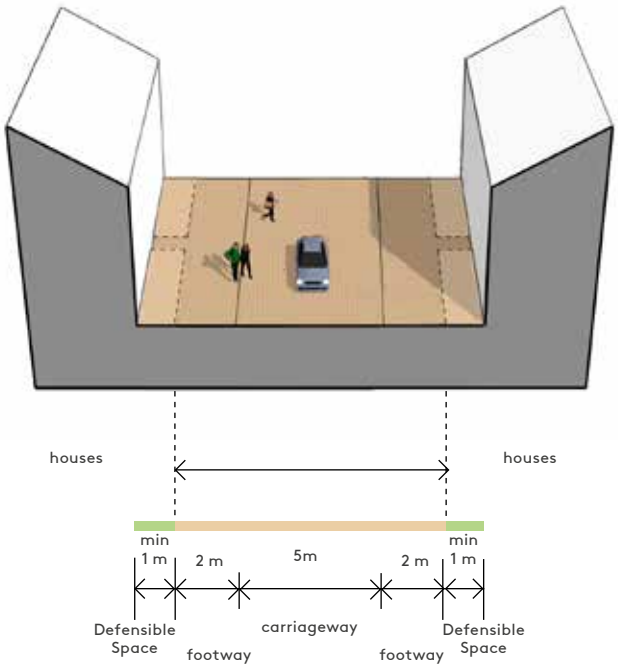


Figure 4.12: Tertiary Street (Option 3) Indicative Section

4.5.7 STREET HIERARCHY: TERTIARY STREET: NEXT TO LANDSCAPE

GENERAL INFORMATION / MANDATORY PRINCIPLES	
STREET TYPE	TERTIARY STREET: NEXT TO LANDSCAPE
LOCATION	Within residential development parcels.
CHARACTER	These streets are typically located along the edge of development and have landscape features between the adopted street boundary and the site boundary.
DIRECT ACCESS TO HOMES?	Yes.
STREET DESIGN	
TOTAL CORRIDOR WIDTH	9.5m.
FOOTPATHS	2m, minimum of one side.
CYCLEWAYS	No.
CARRIAGEWAYS	5m.
PUBLIC TRANSPORT ROUTE	No.
TRAFFIC CALMING	Design speed to primarily be achieved through horizontal features. To be complemented with speed restraint measures at 60-70m intervals.
UTILITIES CORRIDOR	Yes, as per section 5.18: • Sewers under carriageway. • Other utilities under footway.
SURFACE FINISHES	• Surface dressed tarmac to standard carriageway treatment. Block paving to shared surfaces and crossing points.
STREET FURNITURE	• Seating, bins, etc. provided within adjacent landscape spaces.
STREET LIGHTING	• Street lighting to WCC specification. • Lantern Type Urbis Axa.
ON-STREET PARKING	Potential provision for on-street parking, to be confirmed at Reserved Matters Application stage.
TECHNICAL DETAILS	
DESIGN SPEED	20mph.
ROAD MARKINGS	No.
JUNCTION SPACING (CENTRELINE-CENTRELINE)	30m.
JUNCTION RADII	8m.
FORWARD VISIBILITY	25m.
VISIBILITY SPLAYS	25m.
CENTRELINE RADII	13m.
STREET LANDSCAPING	
VERGE WIDTH	1.5m service margin.
STREET TREES	No.
PLANTING PALETTE	N/A.
SUDS	To be determined within detailed design.

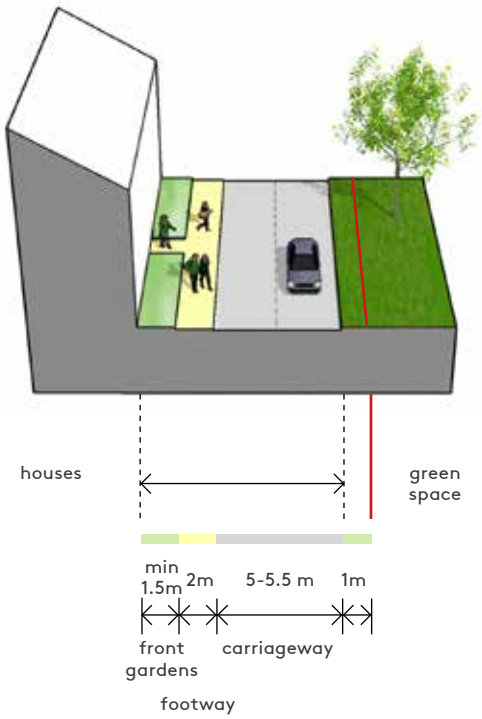


Figure 4.13: Tertiary Street: Next to Landscape Indicative Section

4.5.8 STREET HIERARCHY: TERTIARY GREEN STREET

GENERAL INFORMATION / MANDATORY PRINCIPLES	
STREET TYPE	TERTIARY GREEN STREET
LOCATION	Within residential development parcels.
CHARACTER	These streets are characterised by a landscaped verge and provide off-road pedestrian link between green infrastructure.
DIRECT ACCESS TO HOMES?	Yes.
STREET DESIGN	
TOTAL CORRIDOR WIDTH	13m.
FOOTPATHS	2m, both sides.
CYCLEWAYS	No.
CARRIAGEWAYS	5m.
PUBLIC TRANSPORT ROUTE	No.
TRAFFIC CALMING	Design speed to primarily be achieved through horizontal alignment. To be complemented with speed restraint measures at 60-70m intervals.
UTILITIES CORRIDOR	Yes, as per section 5.18: • Sewers under carriageway. • Other utilities under footway.
SURFACE FINISHES	• Surface dressed tarmac to standard carriageway treatment. Block paving to shared surfaces and crossing points. • Other bound aggregates and stone / concrete paving finishes at points of interface with key Public Open Spaces.
STREET FURNITURE	• Seating, bins, etc. provided within adjacent landscape spaces (e.g. pocket parks).
STREET LIGHTING	• Street lighting to WCC specification. • Lantern Type Urbis Axa.
ON-STREET PARKING	Potential provision for on-street parking, to be confirmed at Reserved Matters Application stage.
TECHNICAL DETAILS	
DESIGN SPEED	20mph.
ROAD MARKINGS	No.
JUNCTION SPACING (CENTRELINE-CENTRELINE)	30m.
JUNCTION RADII	8m.
FORWARD VISIBILITY	25m.
VISIBILITY SPLAYS	25m.
CENTRELINE RADII	13m.
STREET LANDSCAPING	
VERGE WIDTH	4.0m
STREET TREES	Yes.
PLANTING PALETTE	N/A.
SUDS	To be determined within detailed design.

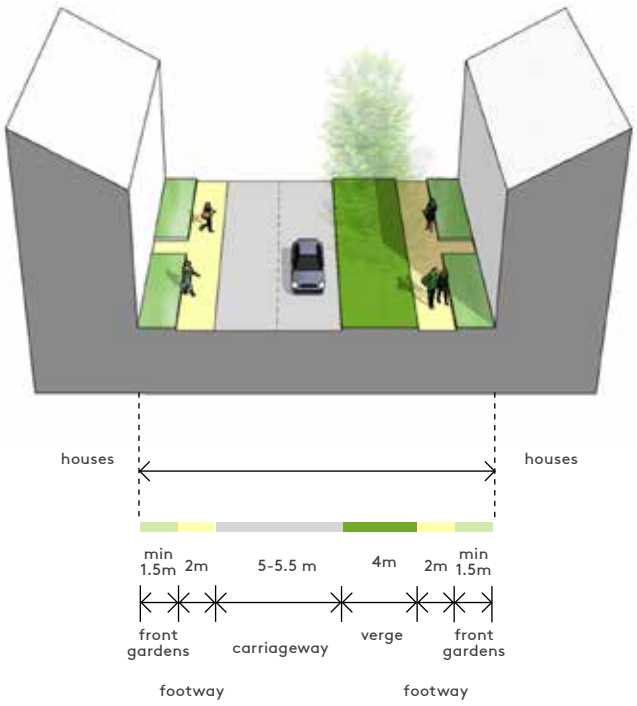


Figure 4.14: Tertiary Green Street Indicative Section

4.5.9 STREET HIERARCHY: TERTIARY STREETS AS SPACES

Tertiary streets will be designed as spaces within which pedestrians and cyclists will be given greater priority over vehicles, and this will be achieved through the alignment, form and enclosure of the street. This form of tertiary street is appropriate for streets that provide access to dwellings within the centre of development parcels, i.e. away from the primary movement network of KP4.

Where tertiary streets are also intended to function as spaces, the following mandatory design principles will be followed:

MANDATORY DESIGN PRINCIPLES

a. Parking areas will be demarcated in a low key manner, through the use of materials.
b. Where visitor street parking is provided, the number of spaces will not exceed four in a row.
c. Parking areas will be defined by landscaping subject to visibility.
d. Buildings surrounding the space will create enclosure through the appropriate use of boundary walls and dwelling frontages, whilst having regard to visibility requirements.
e. Central drainage channels will be provided to drain surface run off within spaces, whilst also acting as a traffic calming measure.
f. High quality surface materials will be used to create an attractive environment for pedestrians, cyclists and vehicles.
g. The carriageway is defined with dropped kerbs and with 2.0m pavements, the minimum width of the whole corridor will be 9m with a required carriageway allowance of 5m..
h. A minimum of 6m clear width will be provided to allow cars to access perpendicular parking spaces.
i. Street furniture, such as benches and cycle parking, will be provided as necessary to encourage informal use by residents to encourage activity within spaces.
j. The space will be designed to achieve pedestrian priority over vehicles

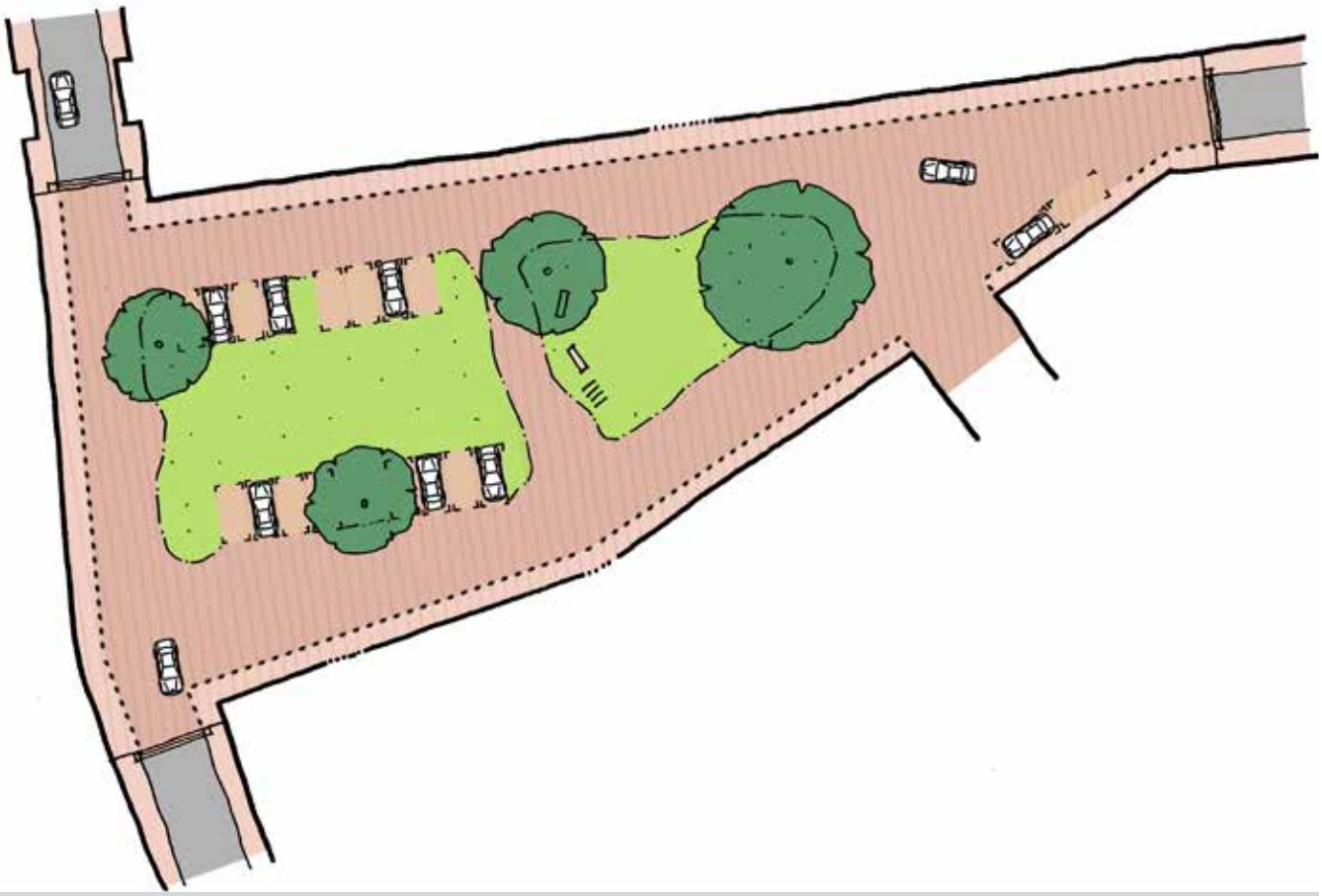


Figure 4.15: Sketch concept of adopted tertiary street as space.

4.5.10 STREET HIERARCHY: SHARED PRIVATE DRIVES

GENERAL INFORMATION	
STREET TYPE	SHARED PRIVATE DRIVES
LOCATION	Within residential development parcels.
CHARACTER	Located along the edge of development, is designed to serve up to 6 homes. Shared private drives are not adoptable.
DIRECT ACCESS TO HOMES?	Yes.
STREET DESIGN	
TOTAL CORRIDOR WIDTH	To be agreed at detailed design stage.
FOOTPATHS	To be determined at detailed design stage.
CYCLEWAYS	No.
CARRIAGEWAYS	Single dwelling – 3m for a minimum length of 5m from back of public highway More than one unit – 5m for a minimum length of 5m from back of public highway
PUBLIC TRANSPORT ROUTE	No.
TRAFFIC CALMING	No.
UTILITIES CORRIDOR	Yes, under private drive.
SURFACE FINISHES	Block paving - the use of alternative materials will need to be set out in a justification statement.
STREET FURNITURE	No.
STREET LIGHTING	No.
ON-STREET PARKING	No.
TECHNICAL DETAILS	
DESIGN SPEED	10mph.
ROAD MARKINGS	No.
JUNCTION SPACING (CENTRELINE-CENTRELINE)	17 - 25m.
JUNCTION RADII	6m.
FORWARD VISIBILITY	11m.
VISIBILITY SPLAYS	Minimum 11m but also to accord with appropriate design speed where connect with higher speed road.
CENTRELINE RADII	9.5 – 11.5m
STREET LANDSCAPING	
VERGE WIDTH	0m.
STREET TREES	No.
PLANTING PALETTE	No.
SUDS	To be determined within detailed design.

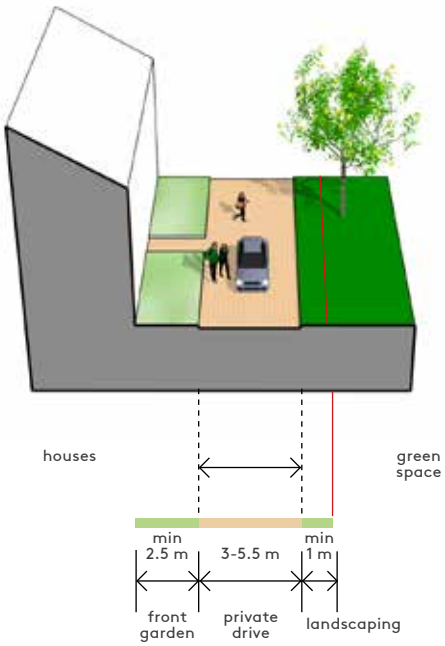


Figure 4.16: Shared Private Drive Indicative Section

4.6 SPEED RESTRAINT FEATURES

Speed restraint measures will be provided at regular intervals according to the design speed and type of street, in accordance with the principles set out in Figure 4.17. A hierarchy of measures is set out in the table below, prioritised from most favourable at the top to least favourable at the bottom. It is intended that developers will take a creative and innovative approach to incorporating these measures into their street design and that a mix of measures appropriate to the built form will be used, as set out in Figure 4.17.

All measures set out would be subject to traffic regulation orders and, safety audits and, in the case of roundabouts, junction modelling.

MEASURE	IMAGE	DESCRIPTION
HORIZONTAL CARRIAGEWAY SHIFTS		• Where possible, streets should be designed to achieve the required design speed without the need for additional speed restraint measures. • Speed restraint bends should be incorporated, where appropriate, to control vehicle speeds. Tertiary streets should be sinuous and designed to minimise the need for additional speed restraint measures. • Appropriate planting could be incorporated to manage forward visibility and give the illusion of narrowing.
GATEWAYS / ENTRY TREATMENTS		• Gateways could typically include a change in road surface and / or carriageway narrowing to alert drivers that they are entering a lower traffic speed area, and should be situated where they are visible to approaching drivers to give them sufficient time to adjust their speed.. • Strategically positioned priority road junctions could be used to effectively control speeds by requiring vehicles to give way to priority traffic. • Gateways could also be provided on tertiary streets to make drivers aware they have left a primary or secondary street.
BUILD OUTS (NARROWING AND CHICANES)		• Build outs would be designed and located so as not to affect access to properties and can also assist with pedestrians crossing the road. • On primary and secondary streets, build outs could reduce the carriageway width to a minimum of 4.8m to retain two-way flow. • On tertiary streets, build outs could reduce the carriageway width to 3m. In this case, signage would be required to indicate who has priority. • The preference is for these to be used in close proximity to other traffic calming features which would ideally be a change in horizontal alignment'
CENTRAL ISLANDS / LOZENGES		• Lozenges can be used to narrow the carriageway to control vehicle speeds and movements These are best used on primary and secondary streets. • Central traffic islands could be used in locations where they can also act as a pedestrian refuge to enable crossing the carriageway in two stages (subject to carriageway widths). • Central islands could also include planting to soften the urban scene and create visual interest. • Lozenges on lower order streets can be used to reinforce the road space allocated to different users.
ON-STREET PARKING		• On-street parking could be used as a positive speed restraint measure in selected locations by reducing capacity and encouraging lower vehicle speeds. • On-street parking would only be implemented on streets with sufficient width to ensure vehicles would not park on the highway.
SURFACE TREATMENTS		• A change in carriageway colour and / or texture (such as block paving) could be used to emphasise a change in environment such as at zone entrances. • Surface treatments may be used to complement other measures such as gateways and raised tables in selected locations such as areas with high pedestrian activity.
RAISED JUNCTIONS		• Raised junctions could be constructed in selected locations with high demand for pedestrian movement, and can allow for easier pedestrian crossing by raising the carriageway level with the footway (subject to a minimal kerb upstand). • Raised junctions can help enhance the appearance of a road and cause drivers to reduce their speed by the use of vertical deflection. • Raised junctions would be most appropriate for street types with a design speed of 20mph where there are no bus routes.

Figure. 4.17 Speed Restraint Features

4.7 VEHICULAR PARKING

Policy D2 of Rugby Borough Council's Local Plan 2011-2031 requires development to have adequate and satisfactory car parking facilities. The Policy also requires electric and/or hybrid vehicle charging points to be provided. Further details and standards are provided in Appendix 5 of the RBC Local Plan. The standards have been updated to provide greater flexibility and take account of the particular nature and setting of development. In this context, RSR is located outside the defined High Access Zone that is focussed around Rugby town centre and its fringes and as such the standards are summarised as:

DWELLING TYPE AND SIZE	REQUIREMENT (SPACE PER UNIT)
DWELLING HOUSES	
1-2 bed units	1.5
3 bed units	2
4 bed units	3
DWELLING APARTMENTS	
Studio units	1
1-2 bed units	1.5
3+ bed units	2

Car parking precedent photographs

Residential

Residential parking will be designed in accordance with the following mandatory design principles:

MANDATORY DESIGN PRINCIPLES

- Residential parking ratio will meet Local Plan standards, unless otherwise agreed by RBC, with a range from 1 parking for studio units to 3 spaces for larger units and are not defined as maximum standards;
- Not all units will necessarily be allocated dedicated parking bays;
- Parking will be provided within the overall plots on the adjacent highway;
- Houses will be provided with garages and/or allocated parking bays in accordance with RBC standards;
- Single Garages should be a minimum of 3.0m width and 6.0m length. Double Garages should be a minimum of 6.0m width by 6.0m length.
- Where a garage is provided, each garage will be designated as one car space plus cycle space.
- Electric and / or hybrid vehicle charging points will be provided with at least 1 "passive" charging point per dwelling; and 1 "active" charging point per 10 unallocated parking spaces;
- The minimum length for a driveway for a single car is 6.0 metres and for tandem parking spaces is 11.5 metres.'
- Where allocated parking bays are provided immediately adjacent to neighbouring bays the width should be 3.0m.
- Parking spaces that are bound on either one or both sides the space should be a minimum width of 3.5m. Where they are unbound on both sides the space should be a 3.0m width.
- Details of the parking layout will be submitted with the relevant Reserved Matters planning applications; and
- Visitor parking will typically be provided on-street within laybys or within communal parking areas. Other on street car parking in association with residential development should generally be discouraged through good design. Details will be submitted with the Reserved Matters planning applications.
- Consideration must be given to providing car parking spaces that are wider than the standard minimum width if spaces are located immediately adjacent to a wall, or other vertical feature that defines the edge of a space, or to accommodate the swept path of vehicles entering car parking spaces from a narrow access (e.g. private drive).
- Specified measurements are to be taken internally from the brick piers.
- Submitted plans to indicate parking spaces with dashed line, in accordance with required dimensions.

4.8 CYCLE PARKING

Cycle parking will be provided in accordance with RBC standards as follows:

MANDATORY DESIGN PRINCIPLES

- Houses – a minimum of 1 space per unit in a secure and undercover location;
- Apartments with less than 3 bedrooms - a minimum of 1 space per unit in a secure and undercover plus 1 loop/hoop per apartment for visitors;
- Apartments with 3 or more bedrooms - a minimum of 2 spaces per unit in a secure and undercover plus 1 loop/hoop per apartment for visitors;
- All residential units will be provided with secure and undercover parking for at least 1 bicycle per unit. Parking for the apartments will be provided internally for residents with spaces within the curtilage for visitors;
- Parking for houses is proposed within the garages (where provided and should allow for both cars and bikes to be stored in the garage and for bikes to be removed without removing a parked car) or alternative location within the rear private curtilage;
- Cycle parking will be provided within public areas for visitors.

Cycle parking precedent photographs

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PART C

Spatial

Chapter 5
Residential Built Form

5.1 RESIDENTIAL BUILT FORM GUIDING DESIGN PRINCIPLES OVERVIEW

This chapter of the design guide builds on the residential design principles set out in the Rugby Radio Station SUE Outline Planning Application and Parameter Plans.

The mandatory design fixes are set out below and are shown on the Regulatory Plan opposite.

The compliance checklist in Appendix 1 presents a complete list of design fix headings from the Design Guide:

- Location of residential development parcels as shown on the Regulatory Plan.
- Residential Layout Design:
  - 5.4 Parcel permeability and Pocket Parks.
  - 5.5 Marker Buildings, Gateway Buildings and Key Groupings.
  - 5.7 Frontage Characters.
- 5.8 Urban Design Principles: fixed design principles that establish the architectural composition of groups of dwellings which comprise street scenes.
- 5.9 Character Areas.
- 5.10 Residential materials application
- 5.11 Plot and building features: five key components of the dwelling plot are identified and a series of specific design principles is specified for each.
- 5.12 Dwelling Typologies Library.
- 5.13 Parking Typologies Library.
- 5.14 Boundary Typologies Library.

KP4 has the potential to deliver up to 1,480 homes. The key objective for the Rugby Radio Station SUE is to create a network of safe and secure streets forming walkable neighbourhoods, and the layout of residential streets plays a major part in this.

MANDATORY DESIGN PRINCIPLES AND REQUIREMENTS (M)

- To continue the layout structure of the former Radio Station site, and maintain views to and from the existing built form within Houlton.
- To ensure the design of KP4 responds to its local setting and reinforces the characteristics of the residential areas of Rugby, as well as the site's former uses as the Radio Station.
- To provide a development structure that is a continuation of that set out in KP1, KP2 and KP3 and provide a transition to a more urban character reflecting the site's proximity to the C Station.
- To increase the density of residential development towards the eastern edge of development to reflect higher densities that will be delivered in the District Centre around C Station.
- To ensure the development provides active frontages facing onto streets and green infrastructure.
- To deliver a rich housing mix with a range of dwelling types and tenures, including affordable housing, to promote social diversity and encourage social inclusion.
- To provide tenure blind housing that seamlessly integrates affordable housing with market housing dwellings (i.e. it should not be possible to distinguish between the design and appearance of affordable housing and market sale housing).

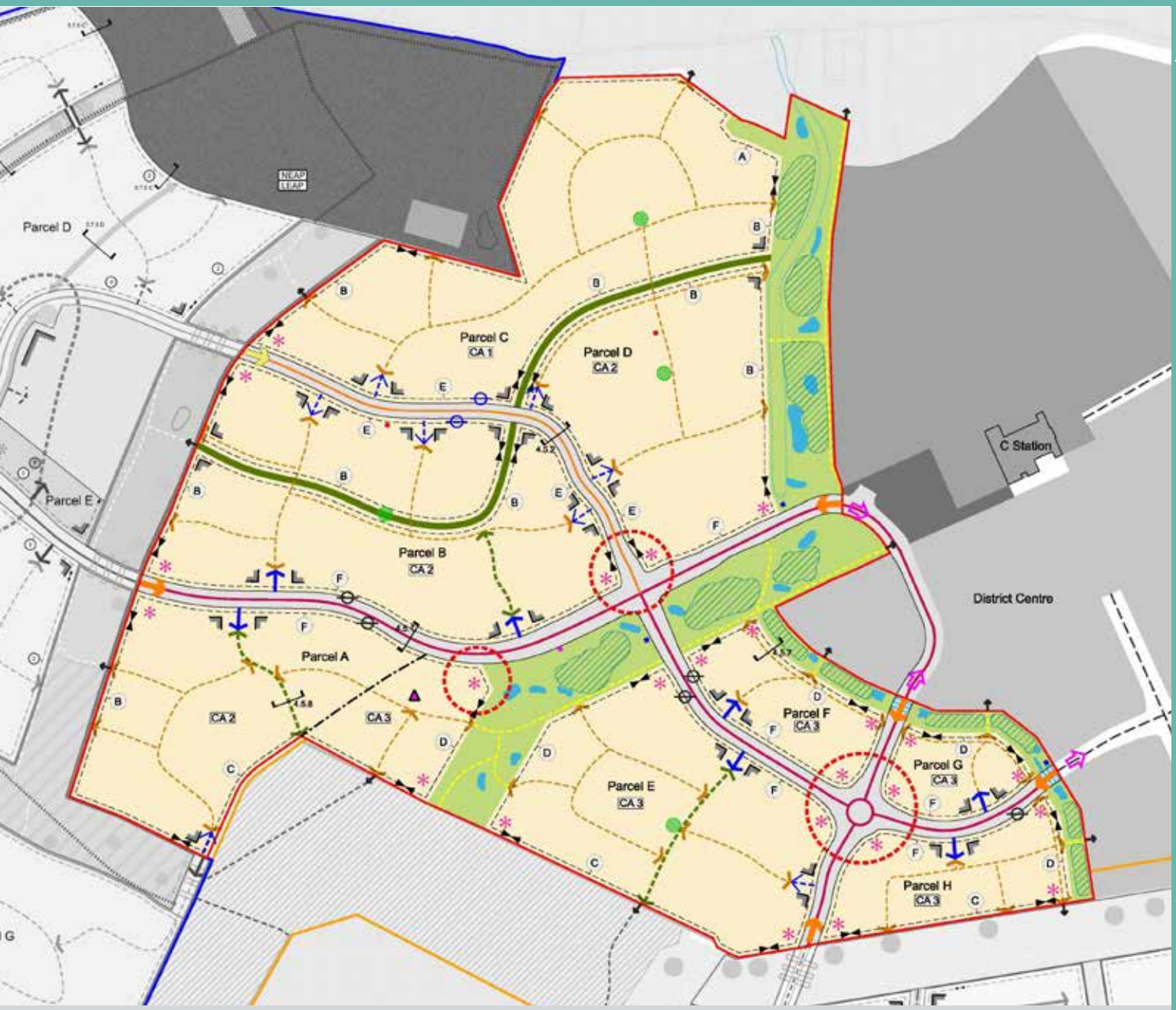


Fig 5.1: KP4 Regulatory Plan

KEY

PART A: CONTEXT

1. Introduction

- Key Phase 4 Planning Application Boundary
- Key Phase 3 Boundary
- Key Phase 2 Boundary

- Building heights up to 15m permitted in this area. Refer to OPA DFP Building Heights Parameter Plan, Section 1.3 of the Design Guide.

2. KP4 Context and Vision

- Residential Land Use

PART B: OPEN SPACE AND MOVEMENT

3. Landscape and Public Realm Design

3.4 Informal Open Space

- 3.4.1 Wildlife Corridors
- 3.4.2 Green Corridor
- 3.4.3 Residential Pocket Parks

3.6 Foul and Surface Water Management:

- Attenuation basin (dry)
- Wet pond
- GCN tunnels

4. Movement and Access

4.2 Access Points

- Site access point off primary street (fixed location)
- Site access point off secondary street
- Onward connection to future phases
- Vehicular access point: fixed location
- Vehicular access point: indicative location

4.3 Cycling and Pedestrian Network

- Footpath within green infrastructure
- Access locations for pedestrian and cycle connections

4.4 Bus Network

- Fixed bus stop location along Primary Street
- Indicative bus stop location along Secondary Street

4.5 Street Hierarchy

- 4.5.1 Primary Street (constructed)
- 4.5.2 Secondary Street
- 4.5.3 Cross Parcel Permeability and Tertiary Streets*
- 4.5.8 Tertiary Green Street* designed at RMA stage

*N.B. Alignment is indicative and should be designed at RMA stage

- Street sections as drawn in the Design Guide

PART C: SPATIAL

5. Built From

- 5.5.1 Marker Buildings
- 5.5.2 Gateway Buildings
- 5.5.3 Key Groupings

5.7 Frontage Character Typology

- (A) 5.7.4 Northern Edge
- (B) 5.7.5 Green Interface
- (C) 5.7.6 Southern Edge
- (D) 5.7.7 District Centre Interface and Central Wildlife Corridors
- (E) 5.7.8 Secondary Street
- (F) 5.7.9 Primary Street

5.9 Character Areas

- CA X Character area
- Character area boundary

5.18 Utility Supplies

- Existing sub station location
- Indicative proposed sub station location
- Existing gas PRI location

5.2 HOW TO READ THIS CHAPTER

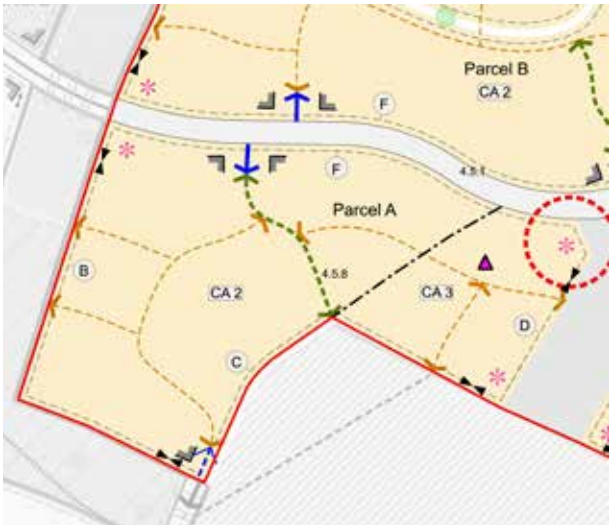
Chapter 5 prescribes the design of the residential development within Houlton Key Phase 4 and builds upon the principles set out in the Outline Planning Submission. The residential development will provide a permeable network of streets and spaces, enclosed and defined by a range of dwelling typologies.
The selection of typologies and the way in which dwellings are grouped together is crucial to achieving the appropriate character for Houlton Key Phase 4.

This Chapter of the Design Code relates closely to the Regulatory Plan; the contents of the Chapter are summarised in the following flow diagram:

UNDERSTANDING THE REGULATORY PLAN

SECTION 5.3

An explanation of relevant layers on the Regulatory Plan relating to residential layout design and how to use these layers.

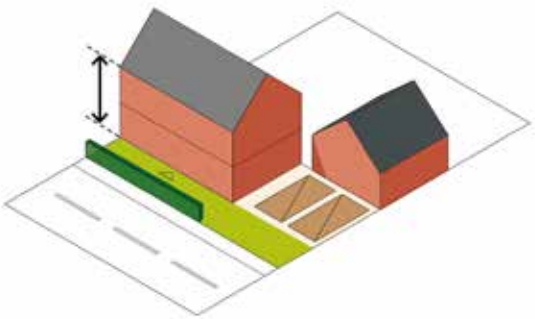


RESIDENTIAL LAYOUT DESIGN

SECTIONS 5.4 - 5.7

Using the layers of the Regulatory Plan to prescribe residential layout design through the following steps:

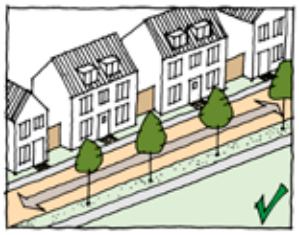
- Minor Streets and Informal Spaces
- Key Groupings
- Frontage Characters

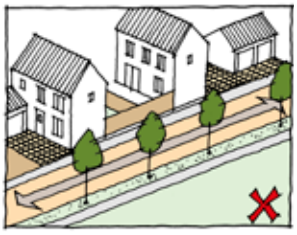


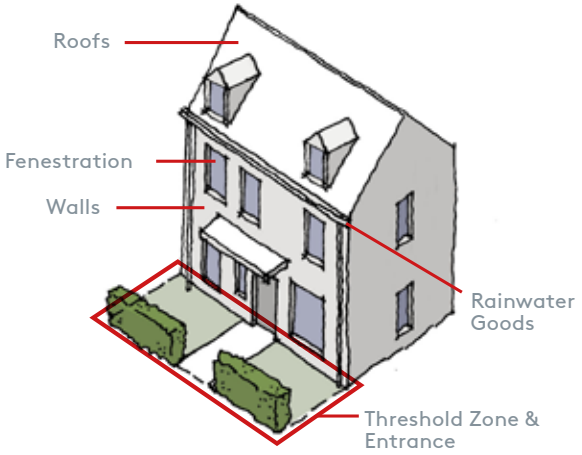
RESIDENTIAL PARCEL LAYOUT & STREETSCENE PRINCIPLES

SECTIONS 5.8 - 5.11

Rules which ensure good urban design principles are applied to residential development, including a section on residential character areas and plot and building features.





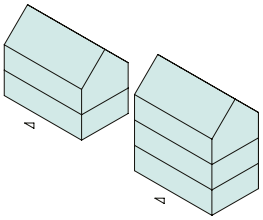


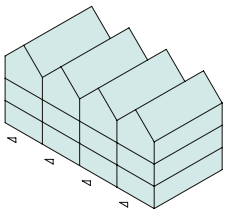
RESIDENTIAL COMPONENTS LIBRARIES

SECTIONS 5.12 - 5.14

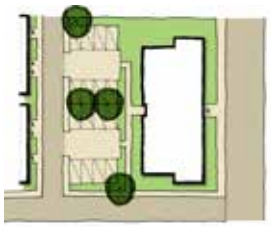
Complete library of:

- dwelling typologies





- parking typologies



- boundary treatments (including where certain types are not permitted)

5.3 UNDERSTANDING AND USING THE REGULATORY PLAN

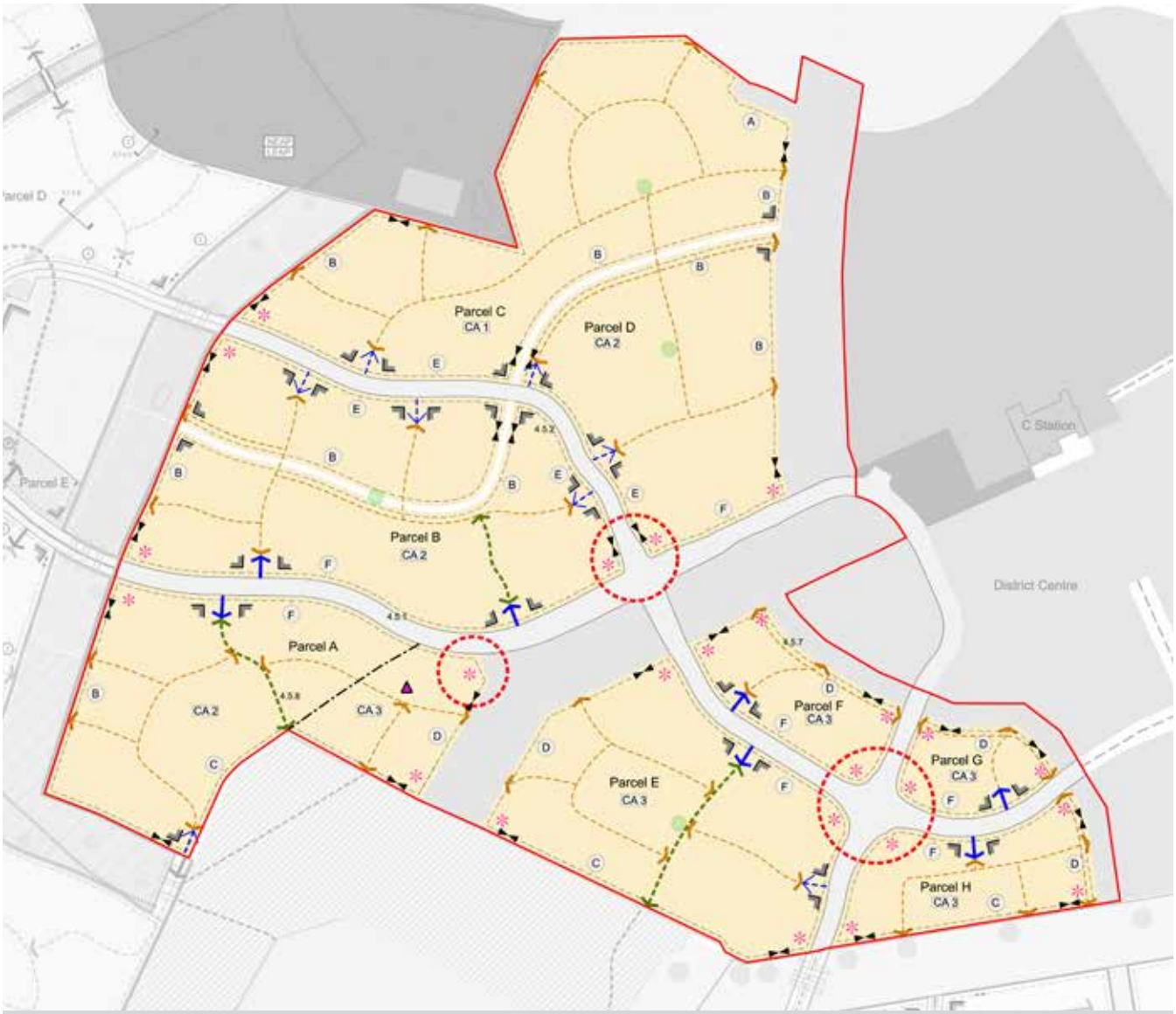


Fig 5.2: Residential Built Form: Extract from the Regulatory Plan

KEY

PART A: CONTEXT

1. Introduction

Key Phase 4 Planning Application Boundary

Building heights up to 15m permitted in this area. Refer to OPA DFP Building Heights Parameter Plan, Section 1.3 of the Design Guide.

2. KP4 Context and Vision

Residential Land Use

PART B: OPEN SPACE AND MOVEMENT

4. Movement and Access

4.2 Access Points

Vehicular access point: fixed location

Vehicular access point: indicative location

4.5 Street Hierarchy

4.5.3 Cross Parcel Permeability and Tertiary Streets*

4.5.8 Tertiary Green Street* designed at RMA stage

*N.B. Alignment is indicative and should be designed at RMA stage

PART C: SPATIAL

5. Built From

5.5.1 Marker Buildings

5.5.2 Gateway Buildings

5.5.3 Key Groupings

5.7 Frontage Character Typology

Ⓐ 5.7.4 Northern Edge

Ⓑ 5.7.5 Green Interface

Ⓒ 5.7.6 Southern Edge

Ⓓ 5.7.7 District Centre Interface and Central Wildlife Corridors

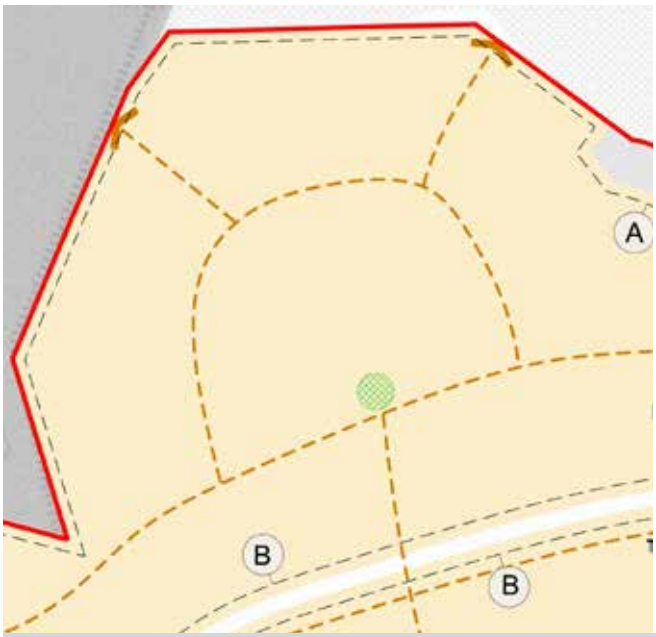
Ⓔ 5.7.8 Secondary Street

Ⓕ 5.7.9 Primary Street

5.9 Character Areas

CA X Character area

Character area boundary



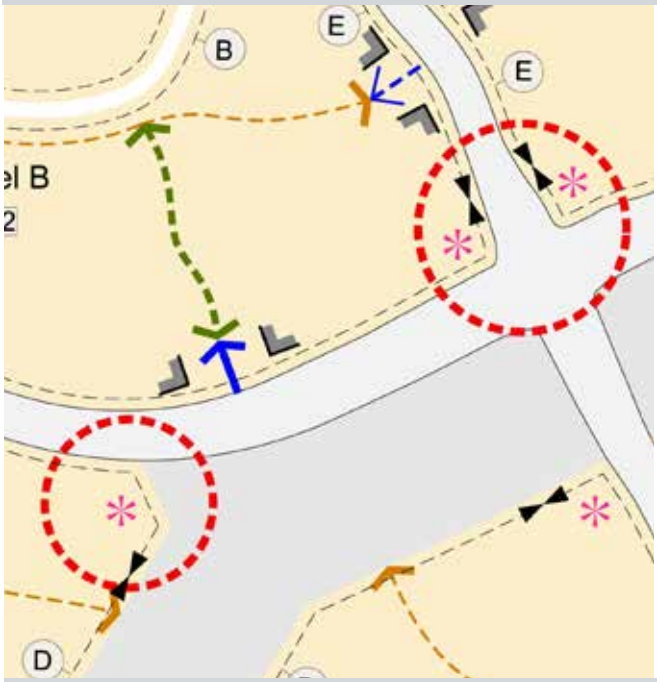
KEY

Residential pocket parks

Tertiary streets and cross parcel permeability

A network of minor streets and informal green spaces will be provided, linking residential development to the wider network of green spaces and streets, and ensuring permeability across all parcels.

Fig 5.3: Parcel permeability and informal spaces



KEY

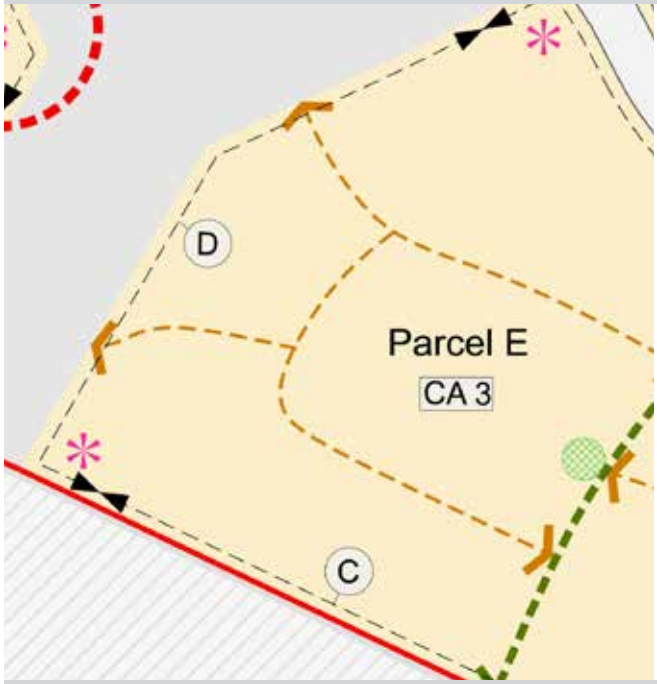
Key grouping

Marker Buildings

Gateway Buildings

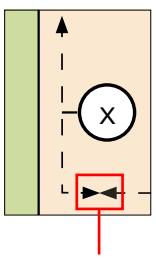
Key Groupings are areas of importance within Houlton Key Phase 4 which require special design consideration. Residential development which relates to a key grouping will follow the principles set out in Section 5.6.

Fig 5.4: Marker buildings, gateway buildings and key groupings



KEY

Frontage Character label (letters A-F)



Different Frontage Character meeting point

The frontage character prescribes the following:

1. Building Line
2. Spacing Between Buildings
3. Building Alignment
4. Plot Components (dwelling typology, parking, boundary typology, set back, dwelling height).

This is annotated on the Regulatory Plan by letters A to F within a circle labelling each edge.

Residential development will adhere to the rules defined by the relevant frontage character as specified on the Regulatory Plan and described in Section 5.7.

Fig 5.5: Frontage character

5.4 PARCEL PERMEABILITY AND POCKET PARKS

5.4.1 Parcel Permeability

Individual development parcels will provide cross parcel permeability through a network of tertiary streets and pedestrian / cycle routes. The cross parcel permeability routes identified on the Regulatory Plan and in Figure 5.6 will be delivered as part of this network. The design of tertiary streets will refer to Chapter 4. The location and layout of the tertiary street network will follow the Urban Design Principles set out in Section 5.8.

Fig 5.6: Parcel Permeability and Pocket Parks Key Plan

5.4.2 Pocket parks and incidental informal spaces

The Regulatory Plan identifies three areas within Key Phase 4 where pockets parks should indicatively be located. These are illustrated in the above key plan. Pocket parks will be a minimum size of 100 sqm and will follow the guidance set out in section 3.4.3, as well as comply with the main design principles illustrated in the sketch below.

Other incidental informal green spaces within residential parcels will follow the same mandatory design principles set out below.

Further information on the landscaping of these areas can be found in chapter 3 of this Design Guide.

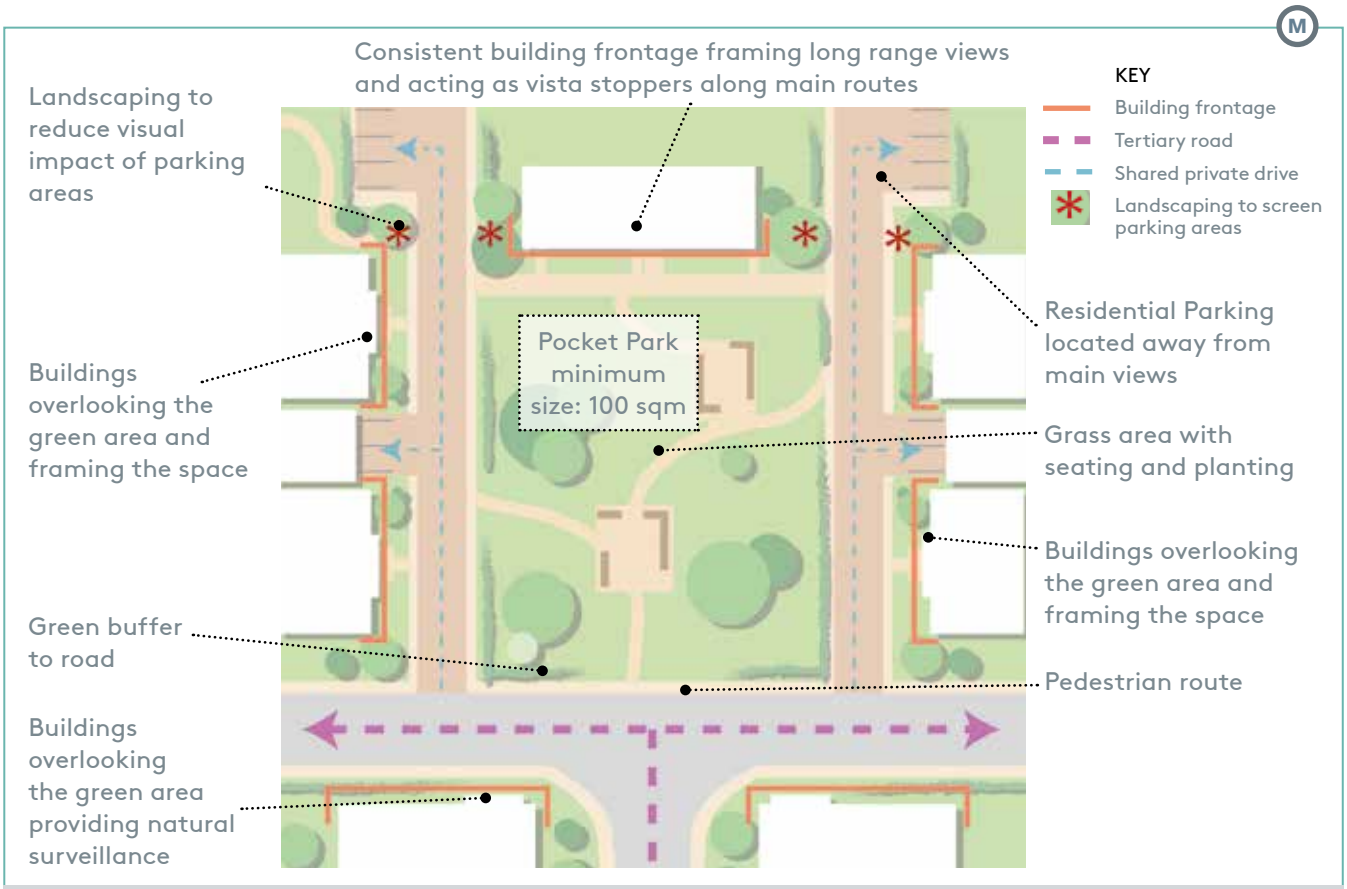


Fig 5.7: Pocket Parks Design Principles Plan

5.5 MARKER BUILDINGS, GATEWAY BUILDINGS AND KEY GROUPINGS

M

5.5.1 Marker Buildings

Marker buildings are buildings in visually prominent locations, addressing key routes and spaces. The positioning and architectural expression of these buildings will therefore be given particular consideration at the design stage of reserved matters applications to ensure appropriate treatment is achieved. Proposals should demonstrate how marker buildings have been designed to reflect their prominence and status: they will demonstrate qualities over and above neighbouring buildings such as distinct architectural form, increased height, increased expanses of glazing, and additional external structure or features.

5.5.2 Gateway Buildings

As with all buildings located on the intersection of routes, all buildings located at junctions along primary and secondary routes are gateway buildings and will be designed to read as a pair, either side of the junction.

Gateway buildings will also be designed to "turn the corner" appropriately, including architectural features such as bays and carefully considered fenestration to add visual interest to flank elevations.

Whilst not as prominent as Marker buildings, Gateway buildings should be a distinctive house type with active windows and architectural features to elevations fronting public areas.

Gateway buildings must nonetheless read as complementary to the streetscenes of which they are part.

5.5.3 Key Groupings

Key Groupings are areas which require special design guidance as they will play an important role in the placemaking at KP4. The three key groupings identified are essential components in creating distinctiveness within KP4. The plan above shows their locations.

The following section sets out the key design principles of each of the groupings, providing a more detailed design brief in addition to the requirements of the Regulatory Plan. This includes the relationship of the built form to the public realm, building alignment, vehicular and pedestrian access, entrance locations, location of parking and service areas, key views and vistas.

The incorporation of these principles is mandatory.

Fig 5.8: Key Groupings Key Plan

5.6 KEY GROUPINGS

5.6.1 Key Grouping 1: Primary Street & Wildlife Corridor

This Key Grouping defines a point where the Central Primary Street and Wildlife Corridor converge from the west and leads toward the District Centre along a single combined corridor. The converging point is important in contributing to the structure and legibility of the development and is therefore an important location for a marker building which will play a key role in terminating views from the District Centre.

The mandatory design principles describe the layout, massing and composition of this key area. All design principles will be adhered to; the illustrations describe how this will be achieved.

MANDATORY DESIGN PRINCIPLES

- Residential development will positively address both the Primary Street and Wildlife Corridor with primary frontages and entrances to provide natural surveillance.
- A marker building will be located on the corner of the residential parcel where the Primary Street and Wildlife Corridor converge. It will be designed to be a prominent building, with increased height, that is visible from the District Centre and provides a strong vista stopper at the end of this axis.
- Landscaping in the Wildlife Corridor will contribute to the setting of this key grouping. This key grouping has to be read in conjunction with the landscape key grouping proposal illustrated in Section 3.3. Landscape proposals should be consistent with it and the building should positively respond to it.
- The marker building and linked boundary walls / structures should be used as a screening edge for the parking area. Parking should not be visible from the Primary Street and Wildlife Corridor. Refer to Section 5.13 and 5.13.1 for principles of parking design.
- The master developer will consider illustrative details of public art adjacent to parcel A. Reseved Matters approval of public art deatils wil be secured and delivered prior to Parcel A being fully occupied.

Fig 5.9: Key Grouping 1 Key Plan

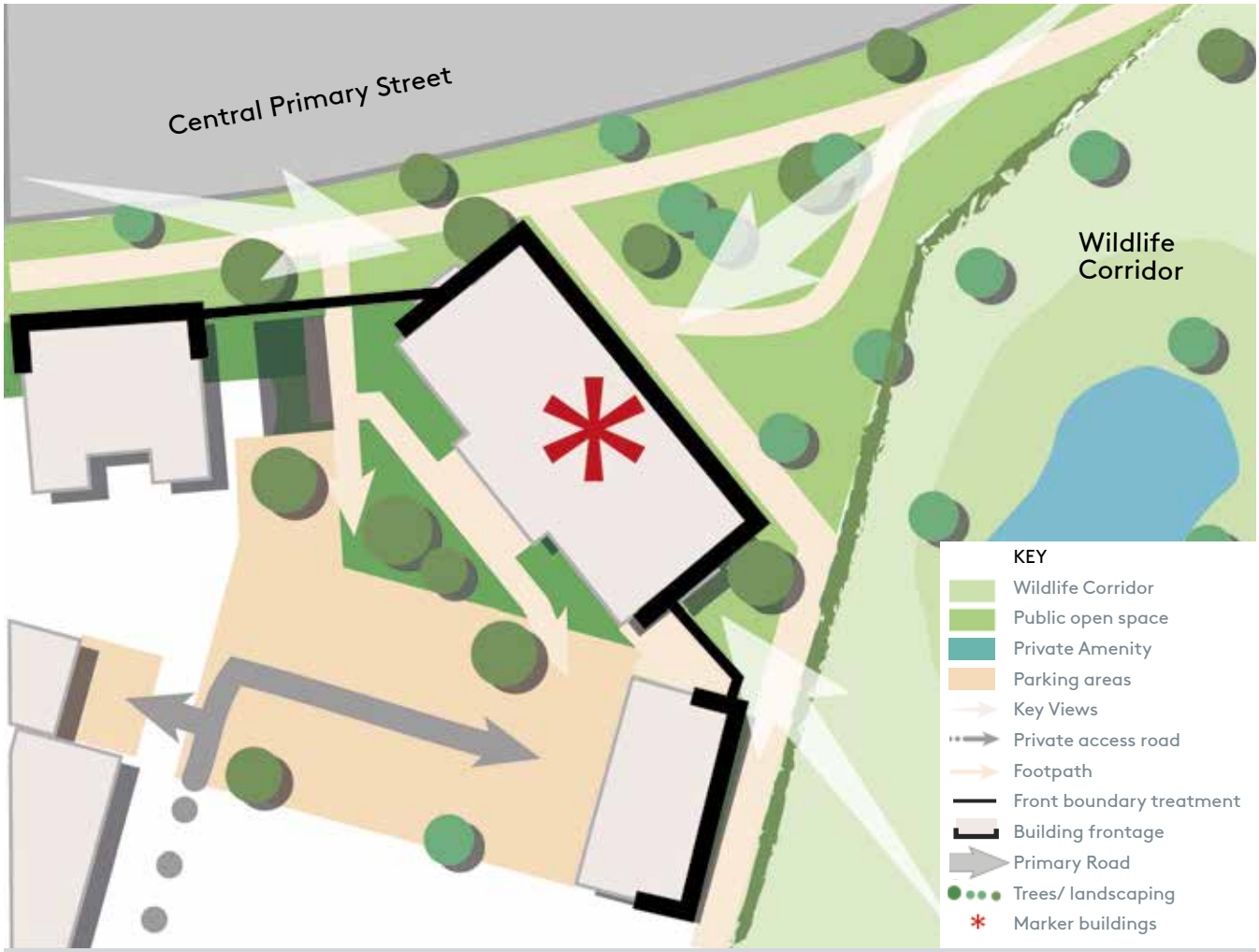


Fig 5.10: Key Grouping 1 Design principles Plan

Fig 5.11: Key Grouping 1 Artist's Impression

5.6 KEY GROUPINGS

5.6.2 Key Grouping 2: Central Primary Street, Secondary Street and District Centre Approach

This Key Grouping focusses on a crossroads where the Central Primary Street meets the secondary street and alters course to pass the District Centre to the south. The grouping is therefore defined to support legibility, as it also sits in a prominent location along the central wildlife corridor and frames long range views. Overall it represents one of the key nodes, which requires emphasis through the built form with prominent marker buildings.

The mandatory design principles describe the layout, massing and composition of this key area. All design principles will be adhered to; the illustrations describe how this will be achieved.

MANDATORY DESIGN PRINCIPLES

- Marker buildings will 'turn the corner' providing active frontage on to both the Secondary Street and Primary Street. They will positively address the junction with increased heights and balanced dual aspects, providing overlooking onto footways and cycleways.
- Entrances to homes will be focused on the Primary Street frontages. Direct connections to footways/ cycleways will be achieved from the main entrances of buildings.
- Vehicular access will only be permitted from the secondary street.
- The two marker buildings are intended to be read as a set piece and should therefore reflect one another in massing, footprint, height and appearance.
- Parking courts should not be visible from the Primary Street. Refer to Section 5.13 and 5.13.1 for principles of parking design.
- Strong structural planting, fenestration to habitable rooms, and projecting bays are to be included on the flank walls of dwellings where these are visible from the Primary Street.

Fig 5.12: Key Grouping 2 Key Plan

Fig 5.13: Key Grouping 2 Design principles Plan

Fig 5.14: Key Grouping 2 Artist's Impression

5.6 KEY GROUPINGS

5.6.3 Key Grouping 3: Central Primary Street and Southern District Centre Approach

This Key Grouping is focussed on a key roundabout between the Central Primary Street and Primary Street that leads north from KP1 and KP2 towards the south-western edge of the District Centre. The grouping is therefore defined to support legibility. Overall it represents one of the key nodes, which requires emphasis through the built form with prominent marker buildings.

The mandatory design principles describe the layout, massing and composition of this key area. All design principles will be adhered to; the illustrations describe how this will be achieved.

M

MANDATORY DESIGN PRINCIPLES

- Residential dwellings are to appropriately 'turn corners' and front onto the junction, with minimal set back.
- Marker buildings will define the corners of the residential parcels and positively address the junction with increased heights and balanced dual aspects, providing overlooking onto footways and cycleways.
- Entrances of the corner buildings will be focussed on the Primary Street frontages.
- Signage and street furniture will be minimal to avoid unnecessary street clutter.
- Direct connections to the footway/cycleway will be achieved from the main entrances of buildings.
- Parking courts should not be visible from the Primary Street. Where this can't be achieved, car barns and/or appropriate front boundary treatment will feature to minimise visual impact from the Primary Road. Refer to Section 5.13 and 5.13.1 for principles of parking design.
- The four marker buildings must reflect one another in massing, footprint, height and appearance.

Fig 5.15: Key Grouping 3 Key plan

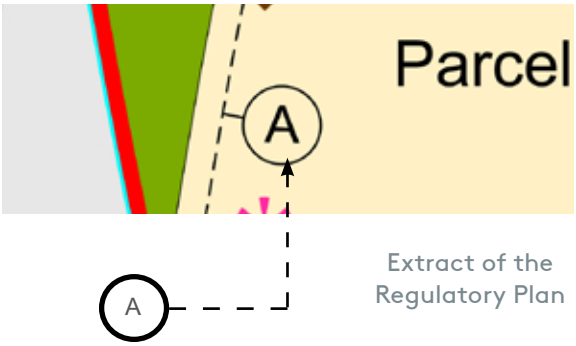
Fig 5.16: Key Grouping 3 Design principles Plan

Fig 5.17: Key Grouping 3 Artist's Impression

5.7 FRONTAGE CHARACTER

Frontage Character Types and Location

Frontage character refers to the relationship between the front of dwellings and the adjacent street or open space. It is defined by a number of factors including the formality or informality of the building alignment, the spacing between buildings and the parking arrangements. This part of the Design Guide focuses on the most prominent edges of development parcels; those that address Primary Streets, Secondary Streets and Wildlife Corridors; which are most critical to ensuring the delivery of a new neighbourhood with a varied but harmonious character.



Extract of the Regulatory Plan

The purpose of the Frontage Character types is to establish appropriate and coherent patterns of built form along key parcel edges according to their location and role in the overall structure of the site-wide masterplan.

Six Frontage Characters have been identified according to location, as shown on the adjacent plan. Each Frontage Character is defined on a double spread comprising mandatory guidelines as well as illustrations showing how a compliant Frontage Character can be achieved. An overview of how to read each Frontage Character spread can be found in section 5.7.1, followed by each character areas.

The components which are specific to each frontage character are explained in sections 5.7.2 and 5.7.3.

The Frontage Characters have to be read in conjunction with the Inner Parcel Character Areas section (Section 5.9) which sets out the design guidelines for the internal areas of parcels. These character areas are listed in the table below.

FORMALITY

INFORMAL	SEMI - FORMAL	FORMAL (M)
'Informal' frontage character refers to a more sinuous arrangement of a variety of dwelling types. Buildings are positioned irregularly, with the occasional staggered building alignment relative to the street. Buildings may form clusters (provided exposed side elevations have been designed to provide visual interest); and will be accessed primarily by shared private drives. The frontage character is more suitable in lower density 'rural' areas fronting on to open green spaces.	'Semi-formal' frontage character refers to a linear arrangement of dwellings characterised by consistency, repetition and rhythm. This may include stepped, symmetrical groupings with access via a shared driveway. It serves as a transition between informal and formal frontage characters, and it is suitable to achieve a higher degree of fomality along the edges.	'Formal' frontage character refers to dwelling arrangements which combine a consistent building line, order, and a high degree of enclosure. This may include 'set-piece' symmetrical arrangements. It is suitable for gateways or along main roads frontages.
A Northern Edge	B Green interface Southern Edge C District Centre Interface & Central D Wildlife Corridor	E Secondary Street Primary Street F
INNER PARCEL CHARACTER AREAS (REFER TO SECTION 5.9 FOR DETAILS)		
Clifton Brook South	Central Neighbourhood	Normandy Hill North

Inner Parcel Character Areas Key plan (Refer to Section 5.9)

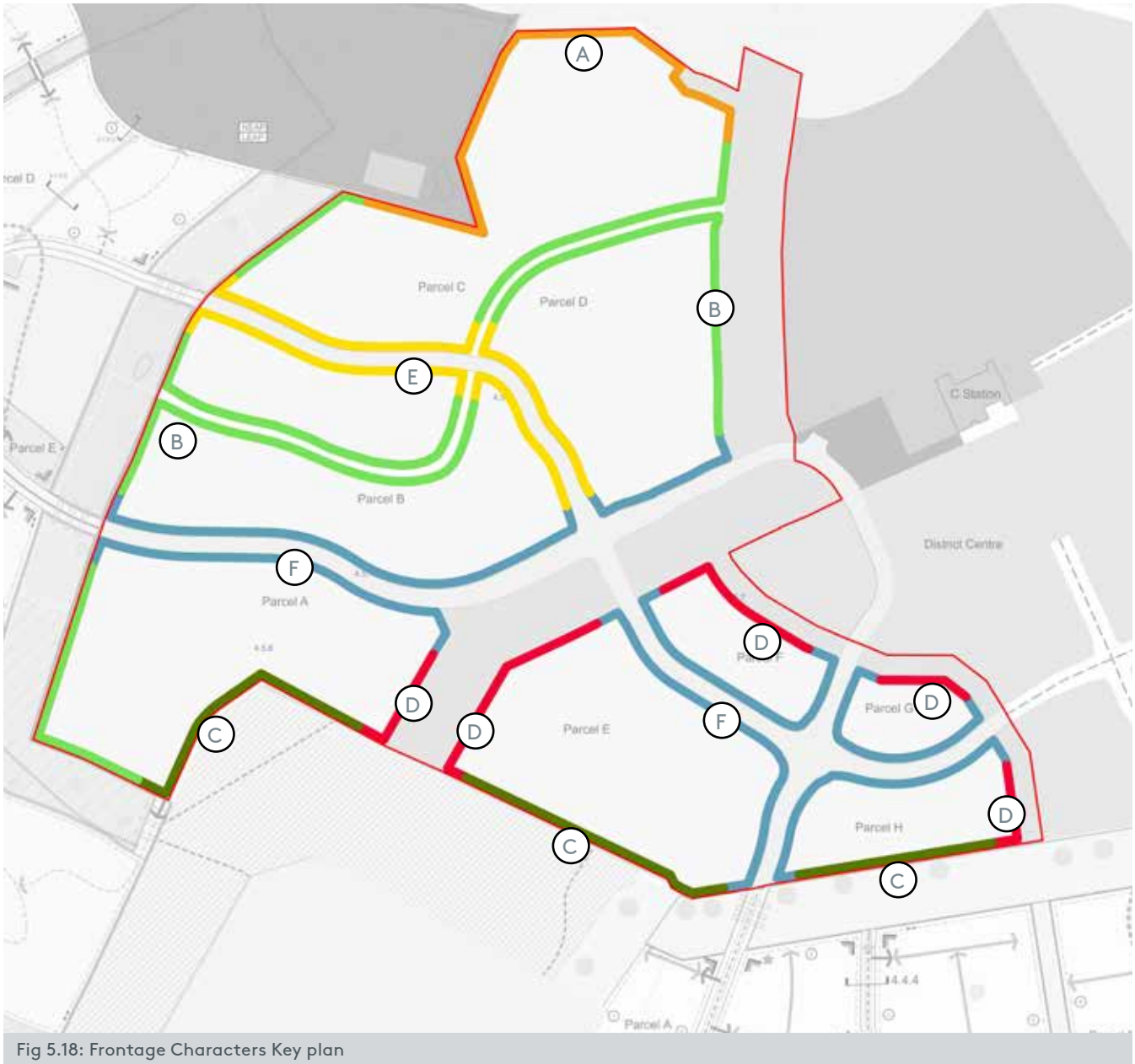


Fig 5.18: Frontage Characters Key plan

5.7.1 How to read the Frontage Character spreads

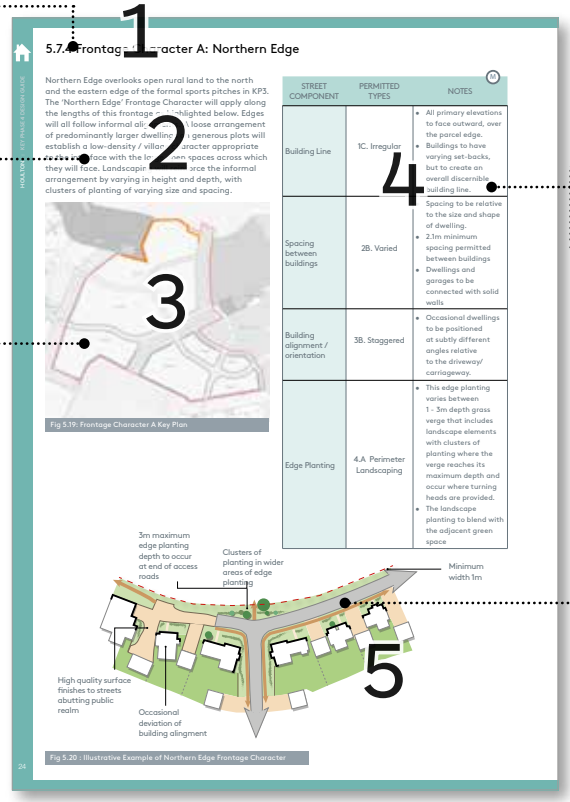
STEP A: FRONTAGE CHARACTER:
DETERMINE THE FRONTAGE CHARACTER(S) RELATING TO YOUR PARCELS.

STEP B: FRONTAGE CHARACTER:
DETERMINE THE COMPONENTS THAT RELATE TO THE RELEVANT FRONTAGE CHARACTER.

1. Identification of Frontage Character in the context of Houlton Key Phase 4

2. Description of Frontage Character.

3. Location plan of Frontage Character.



4. Table of permitted street component types (specific to each frontage character).

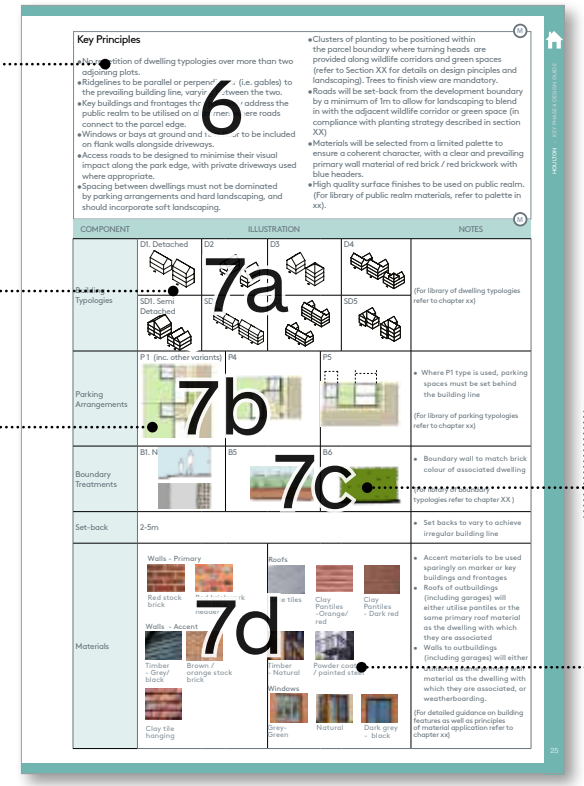
5. Illustration demonstrating how the frontage character components may come together to create the street scene.

STEP C: PARCEL FRONTAGE:
DETERMINE KEY PRINCIPLES AND COMPONENTS IN THE RESPECTIVE FRONTAGE CHARACTER.

6. Key Design Principles.

7a. List of permitted dwelling typologies (specific to each frontage character).

7b. List of permitted parking typologies (specific to each frontage character).



7c. List of permitted boundary treatments (specific to each frontage character).

7d. List of permitted materials and the principles of their application.

5.7.2 Frontage Character Components

FRONTAGE CHARACTER COMPONENTS

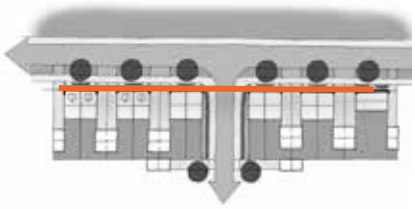
Refer to each individual Frontage Character section to identify which components are allowed for each specific frontage.

1. STREET BUILDING LINE

How buildings are arranged along the street whether the positioning of the buildings is linear, stepped or informally varied.

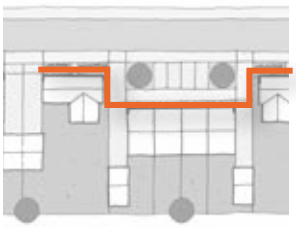
1.A LINEAR

Building frontage follows a straight line. This does not mean building elevations must be 'flat'.



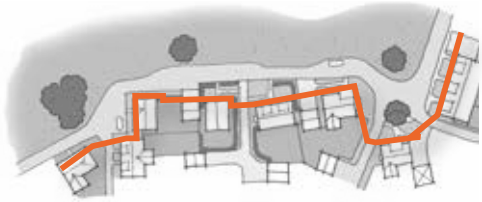
1.B STEPPED

Building set backs will vary to create a stepped building line. The front line of a building should not be stepped back further than the rear line of the nearest neighbouring building. Blank flank elevations will not be permitted.



1.C IRREGULAR

Buildings may step forwards or backwards and are not required to be parallel to the street / lane (note: the degree of informality should be determined in relation to the degree to which the alignment of the lane is also informal). Blank flank elevations will not be permitted.

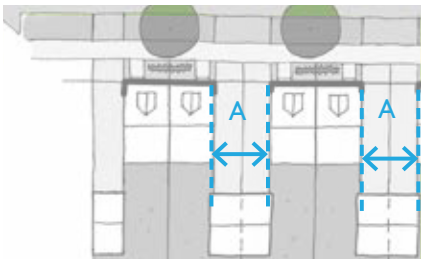


2. SPACING BETWEEN BUILDINGS

The spacing influences the enclosure of a street or space. It is likely to increase in lower density areas to allow for parking between dwellings, and decrease in higher density areas to create greater enclosure to the public realm.

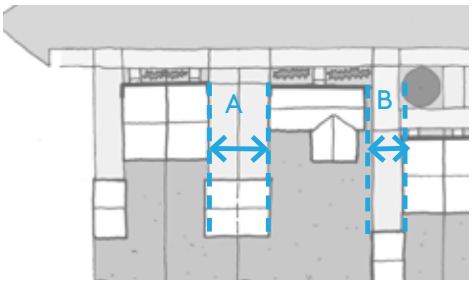
2.A CONSISTENT

Buildings are spaced at approximately even intervals.



2.B VARIED

Gaps between buildings may vary but should have a rationale relating to e.g. the size and shape of the house.



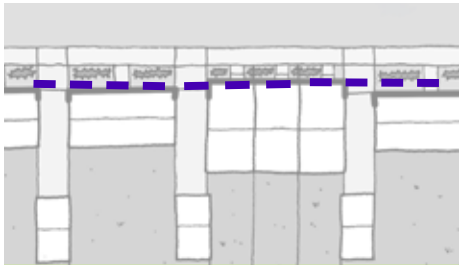
FRONTAGE CHARACTER COMPONENTS

3. INDIVIDUAL BUILDING ALIGNMENT

The angle the buildings are positioned relative to the road or space and each other.

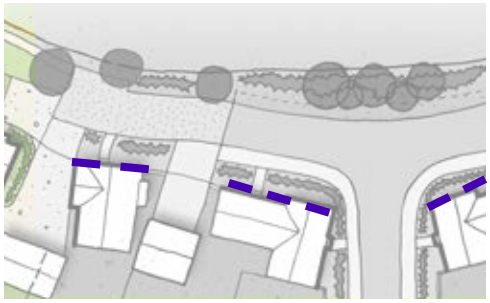
3.A PARALLEL TO STREET

Building alignments respond to the alignment of the street.



3.B STAGGERED

Building alignments may deviate from alignment of street.



4. PARCEL EDGE LANDSCAPING

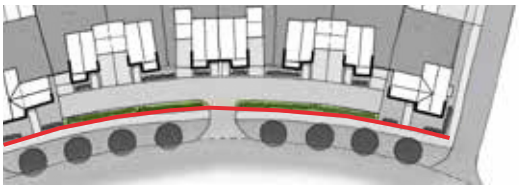
Landscape treatment on the edge of, but within, the residential parcel curtilage.

4.A PERIMETER LANDSCAPING

A minimum of 1m and maximum 3m set back from the site boundary to include landscape elements and allow the perimeter landscape to blend in with the adjacent wildlife corridor or green space. Where turning heads are provided along wildlife corridors, their design and landscaping strategy must comply with design principles set in section 3.5 of this Guide.

4.B NEIGHBOURHOOD STREET PLANTING

This edge planting is only applicable when vehicular access to plots is via a shared driveway, whereby a 1.5m verge with hedge is required to separate the edge of the highways corridor (i.e. back of footpath/ cycleway) and the shared driveway.

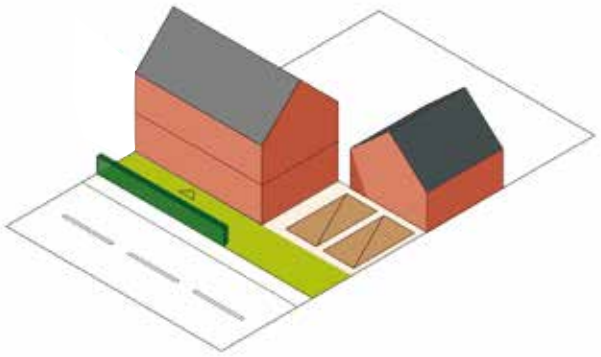


5.7.3 Frontage Character Components

FRONTAGE CHARACTER COMPONENTS

5. PLOT COMPONENTS

There are four components which determine the design of a plot. These components can be combined in a number of ways to create different residential character. Each frontage character on the following pages sets out design principles for each component along the parcel edges.



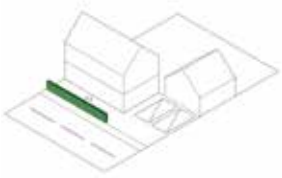
DWELLING TYPOLOGY

D -Detached
SD -Semi-detach
T - Terraced
U - Urban housing
F - Flats

PARKING TYPOLOGY

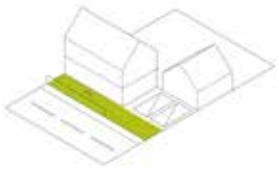
There must be a variety of parking typologies used to minimise the visual intrusion of the car within the street scene. Specific parking provision for each Reserved Matters application to be agreed with RBC.

BOUNDARY TYPOLOGY



The boundary definition separates the private and public realm

SET BACK

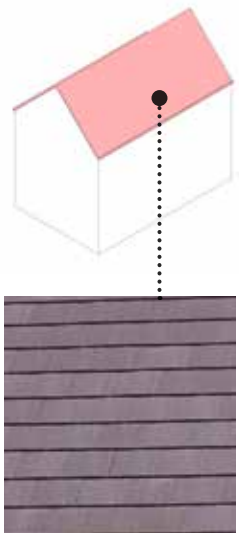


The set back of a dwelling relates to the distance in metres from the back edge of pavement to the front facade of the dwelling. This space can include a front garden where suitable.

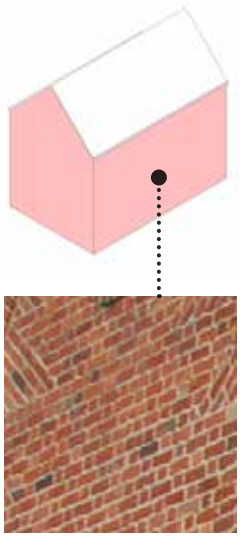
6. MATERIALS

The materials which are permitted along any given frontage are covered in the frontage characters sections and comprise materials for roofs, walls, windows and balconies. For detailed information regarding the principles of material application refer to chapter 5.10-5.11.

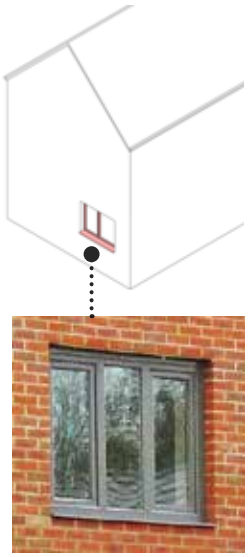
ROOFS



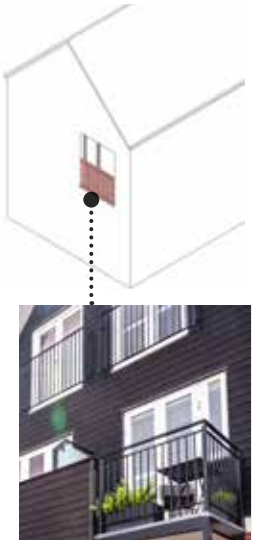
WALLS



WINDOWS



BALCONIES



5.7.4 Frontage Character A: Northern Edge

Northern Edge overlooks open rural land to the north and the eastern edge of the formal sports pitches in KP3. The 'Northern Edge' Frontage Character will apply along the lengths of this frontage as highlighted below. Edges will all follow informal alignments. A loose arrangement of predominantly larger dwellings on generous plots will establish a low-density / village character appropriate to the interface with the large open spaces across which they will face. Landscaping will reinforce the informal arrangement by varying in height and depth, with clusters of planting of varying size and spacing.

Fig 5.19: Frontage Character A Key Plan

STREET COMPONENT	PERMITTED TYPES	NOTES (M)
Building Line	1C. Irregular	• All primary elevations to face outward, over the parcel edge. • Buildings to have varying set-backs, but to create an overall discernible building line.
Spacing between buildings	2B. Varied	• Spacing to be relative to the size and shape of dwelling. • 2.1m minimum spacing permitted between buildings • Dwellings and garages to be connected with solid walls
Building alignment / orientation	3B. Staggered	• Occasional dwellings to be positioned at subtly different angles relative to the driveway/ carriageway.
Edge Planting	4.A Perimeter Landscaping	• This edge planting varies between 1 - 3m depth grass verge including landscape elements. Tree planting to be provided where turning heads are proposed. • The landscape planting to blend with the adjacent green space

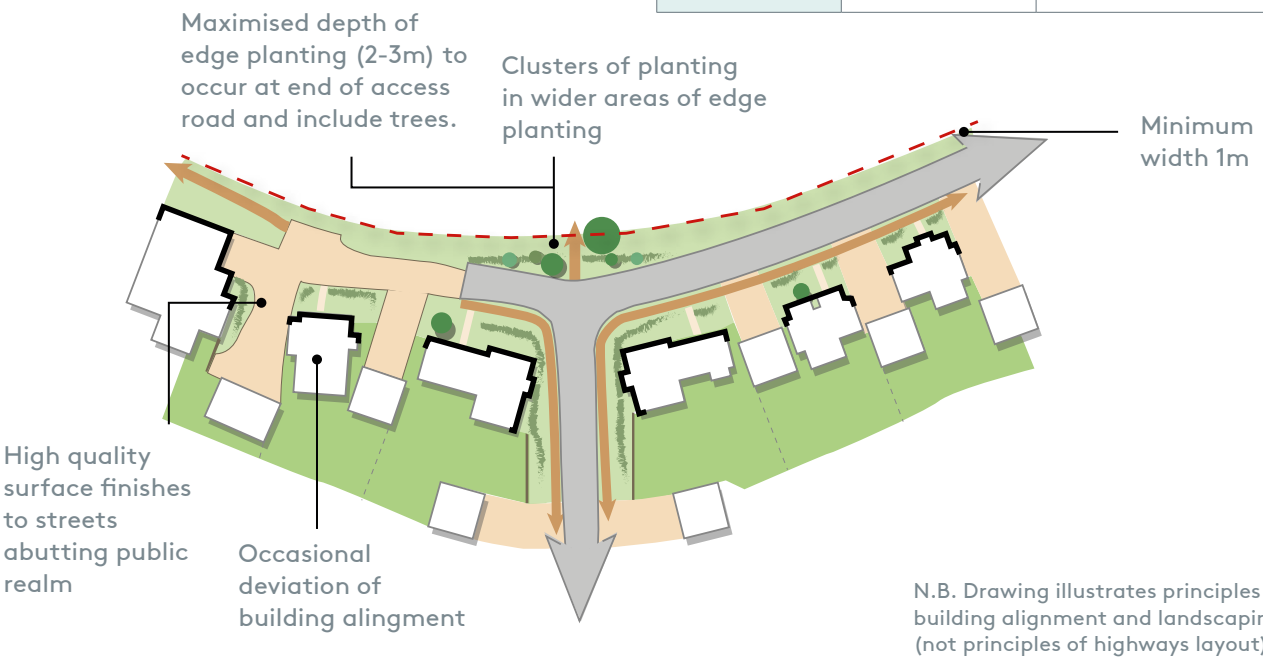
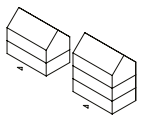
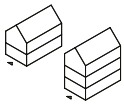
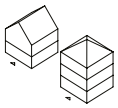
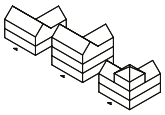
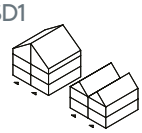
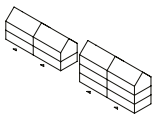
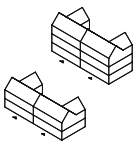
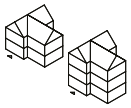
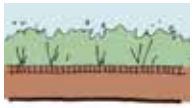
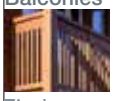


Fig 5.20 : Illustrative Example of Northern Edge Frontage Character

MANDATORY KEY PRINCIPLES

- No repetition of dwelling typologies over more than two adjoining plots.
- Ridgelines to be parallel or perpendicular (i.e. gables) to the prevailing building line, varying between the two.
- Key buildings and frontages that positively address the public realm to be utilised on all corners where roads connect to the parcel edge.
- Windows or bays at ground and first floor to be included on flank walls alongside driveways.
- Access roads to be designed to minimise their visual impact along the park edge, with private driveways used where appropriate.
- Spacing between dwellings must not be dominated by parking arrangements and hard landscaping, and should incorporate soft landscaping and tree planting in all possible locations.
- Clusters of planting to be positioned within the parcel boundary where turning heads are provided along wildlife corridors and green spaces (refer to Section 3.5 for details on design principles and landscaping). Trees must be planted on parcel boundaries at the end of access roads where they form a turning head / meet private drives.
- Roads will be set-back from the development boundary by a minimum of 1m to allow for landscaping to blend in with the adjacent wildlife corridor or green space (in compliance with planting strategy described in section 3.12)
- Materials will be selected from a limited palette to ensure a coherent character, with a clear and prevailing primary wall material of red brick / red brickwork with blue headers.
- High quality surface finishes to be used on public realm. (For library of public realm materials, refer to palette in section 3.8).

COMPONENT	ILLUSTRATION	NOTES
Building Typologies	D1, D2, D3, D4     SD1, SD2, SD3, SD5    	(For library of dwelling typologies refer to section 5.12)
Parking Arrangements	P 1 (inc. other variants), P4, P5   	• Where P1 type is used, parking spaces must be set behind the building line (For library of parking typologies refer to section 5.13)
Boundary Treatments	B4, B5, B6   	• Boundary wall to use the same primary wall material of the associated dwelling (For library of boundary typologies refer to section 5.14)
Set-back	2-5m	• Set backs to vary to achieve irregular building line
Materials	Walls - Primary  Red stock brick  Red brickwork with blue headers Walls - Accent  Timber - Grey/ black  Clay tile hanging Roofs  Grey Slate tiles  Orange/red tiles red tiles  Dark red tiles Balconies  Timber - Natural  Powder coated / painted steel Windows  Grey-Green  Natural  Dark grey - black	• Accent materials to be used sparingly on marker or key buildings and frontages • Roofs of outbuildings (including garages) will utilise the same primary roof material as the dwelling with which they are associated • Thin leading edge roof tiles only • Walls to outbuildings (including garages) will either utilise the same primary wall material as the dwelling with which they are associated, or weatherboarding where this would result in an improvement in the design of the scheme. (For detailed guidance on building features and principles of material application refer to section 5.10-5.11)

5.7.5 Frontage Character B: Green Interface

The Green Interface frontage character overlooks wildlife corridors to the west and east and applies to the lengths of the green corridor leading from the Secondary Road towards the Secondary School in the east. A similar degree of informality is required for the Green Corridors as the Northern Edge frontage character (see Frontage Character A spread), albeit greater flexibility in house types and parking typologies is permitted, enabling the gradual increase in density that is expected towards the eastern parcels of KP4. A variety of dwelling typologies will be expected along the parcel edges, emphasising their informal character, but in all cases providing positive frontage to, and natural surveillance of, the public space.

Fig 5.21: Frontage Character B Key Plan

STREET COMPONENT	PERMITTED TYPES	NOTES (M)
Building Line	1.B Stepped	• All primary elevations to face outward, over the parcel edge. • Buildings to have varying set-backs, but to create an overall discernible building line.
Spacing between buildings	2B. Varied	• Spacing to be relative to the size and shape of dwelling. • Spacing between buildings to be minimised but no less than 2.1m.
Building alignment / orientation	3.A Parallel to street	
Edge Planting	4.A Perimeter Landscaping	• This edge planting varies between 1 - 3m depth grass verge including landscape elements. Tree planting to be provided where turning heads are proposed. • The landscape planting to blend with the adjacent green space

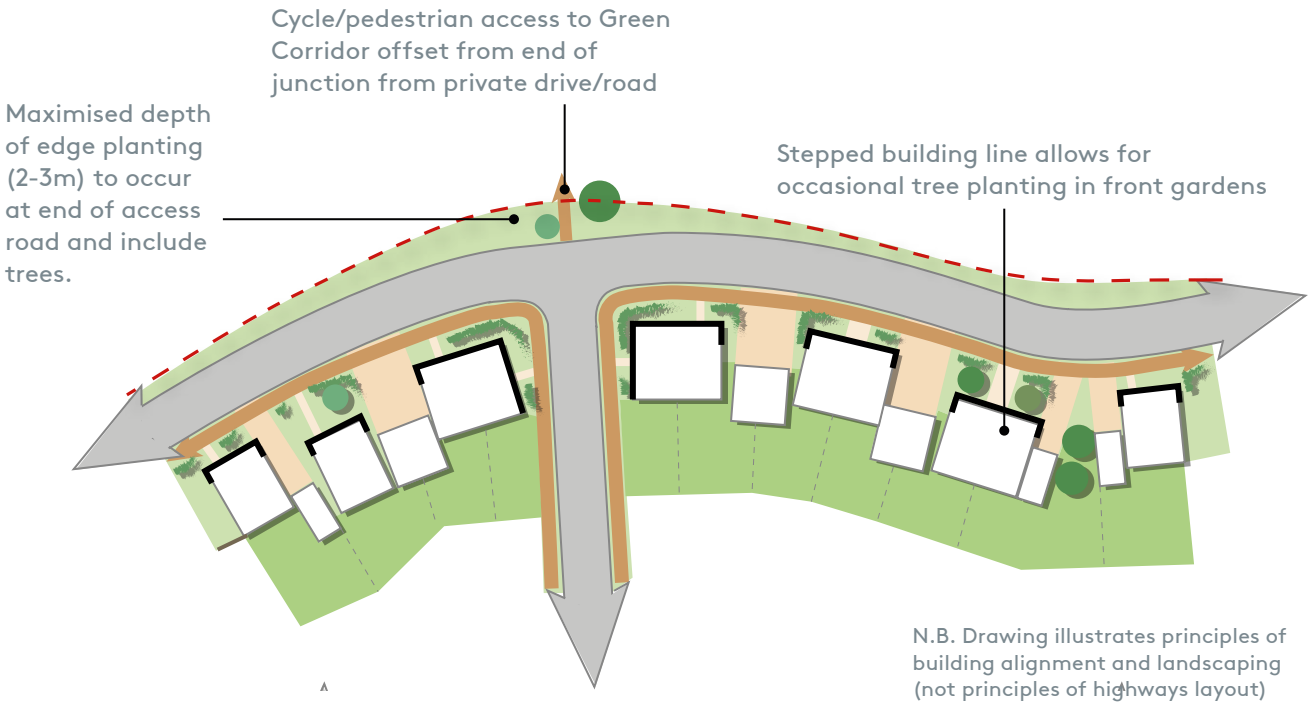
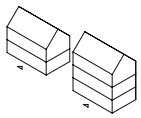
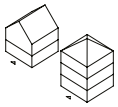
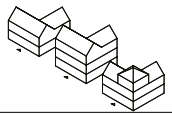
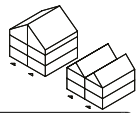
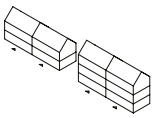
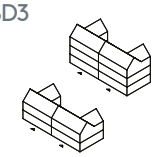
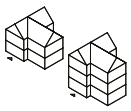
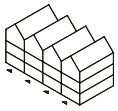
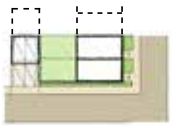
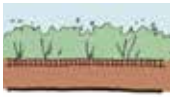


Fig 5.22 : Illustrative Example of Green Interface Frontage Character

MANDATORY KEY PRINCIPLES

- No repetition of dwelling typologies over more than two adjoining plots (with the exception of dwellings forming terraces).
- Ridgelines to be parallel or perpendicular (i.e. gables) to the prevailing building line, varying between the two.
- Key buildings and frontages that positively address the public realm to be utilised on all corners where roads connect to the parcel edge.
- Windows or bays at ground and first floor to be included on flank walls alongside driveways.
- Access roads to be designed to minimise their visual impact along the open space edge, with private driveways used where appropriate.
- Clusters of planting to be positioned within the parcel boundary where turning heads are provided along wildlife corridors and green spaces (refer to Section 3.5 for details on design principles and landscaping).
- Trees must be planted on parcel boundaries at the end of access roads where they form a turning head / meet private drives.
- Roads will be set-back from the development boundary by a minimum of 1m to allow for landscaping to blend in with the adjacent wildlife corridor or green space (in compliance with planting strategy described in section 3.12)
- Materials will be selected from a limited palette to ensure a coherent character, with a clear and prevailing primary wall material of red brick/ red brickwork with blue headers.
- High quality surface finishes to be used on public realm. (For library of public realm materials, refer to palette in section 3.8)
- Dwellings and garages to be connected with solid walls.
- When addressing corners, priority frontage should be for one which provides greater formality.

COMPONENT	ILLUSTRATION	NOTES
Building Typologies	D1, D4, D4, SD1     SD2, SD3, SD5, T1    	• Larger buildings define the corners. • Maximum 4 dwellings to form terrace. (For library of dwelling typologies refer to section 5.12)
Parking Arrangements	P1 (inc. other variants), P2, P5   	• Where P1 type is used, parking spaces must be set behind the building line (For library of parking typologies refer to section 5.13)
Boundary Treatments	B4, B5, B6, B9    	• 'Boundary wall to use the same primary wall material of the associated dwelling' ★ Low timber knee rail to be provided along the green corridor edge only (For library of boundary typologies refer to section 5.14)
Set-back	2-5m	• Set backs to vary to achieve irregular building line
Materials	Walls Primary  Red stock brick Walls - Accent  Timber - Grey/ black  Buff stock brick  Render - White / Ochre Roofs  Gray Slate tiles  Orange/red tiles red tiles  Dark red tiles Balconies  Timber - Natural  Powder coated / painted steel Windows  Grey-Green  Natural  Dark grey - black	• Accent materials to be used sparingly on marker or key buildings and frontages • Roofs of outbuildings (including garages) will utilise the same primary roof material as the dwelling with which they are associated • Thin leading edge roof tiles only. • Walls to outbuildings (including garages) will either utilise the same primary wall material as the dwelling with which they are associated, or weatherboarding where this would result in an improvement in the design. (For detailed guidance on building features and principles of material application refer to section 5.10-5.11)

5.7.6 Frontage Character C: Southern Edge

The Southern Edge frontage character overlooks Normandy Hill and development edges across the wildlife corridor in KP2 to the south. The Southern Edge frontage character will create the gateway into the Key Phase and to District Centre in the future approaching from the south. It is semi-formal in character and acts as a transition between the KP2 to the south and the higher density frontages of the Primary Street and Central Wildlife Corridor.

Residential development will be characterised primarily by larger detached and semi-detached dwellings on corners with terraces or linked detached dwellings in between. Dwellings will be positioned along the parcel edge that faces the open space and in all cases will provide positive frontage to, and natural surveillance of, the public space it faces.

Fig 5.23: Frontage Character C Key Plan

STREET COMPONENT	PERMITTED TYPES	NOTES (M)
Building Line	1.B Stepped	• All primary elevations to face outward, over the parcel edge • Buildings to have varying set-backs, but to create an overall discernible building line.
Spacing between buildings	2.B Varied	• Spacing to be relative to the size and shape of dwelling. • Spacing between buildings to be minimised but no less than 2.1m.
Building alignment / orientation	3.A Parallel to street	
Edge Planting	4.A Perimeter Landscaping	• This edge planting varies between 1 - 3m depth grass verge including landscape elements. Tree planting to be provided where turning heads are proposed. • The landscape planting to blend with the adjacent green space.

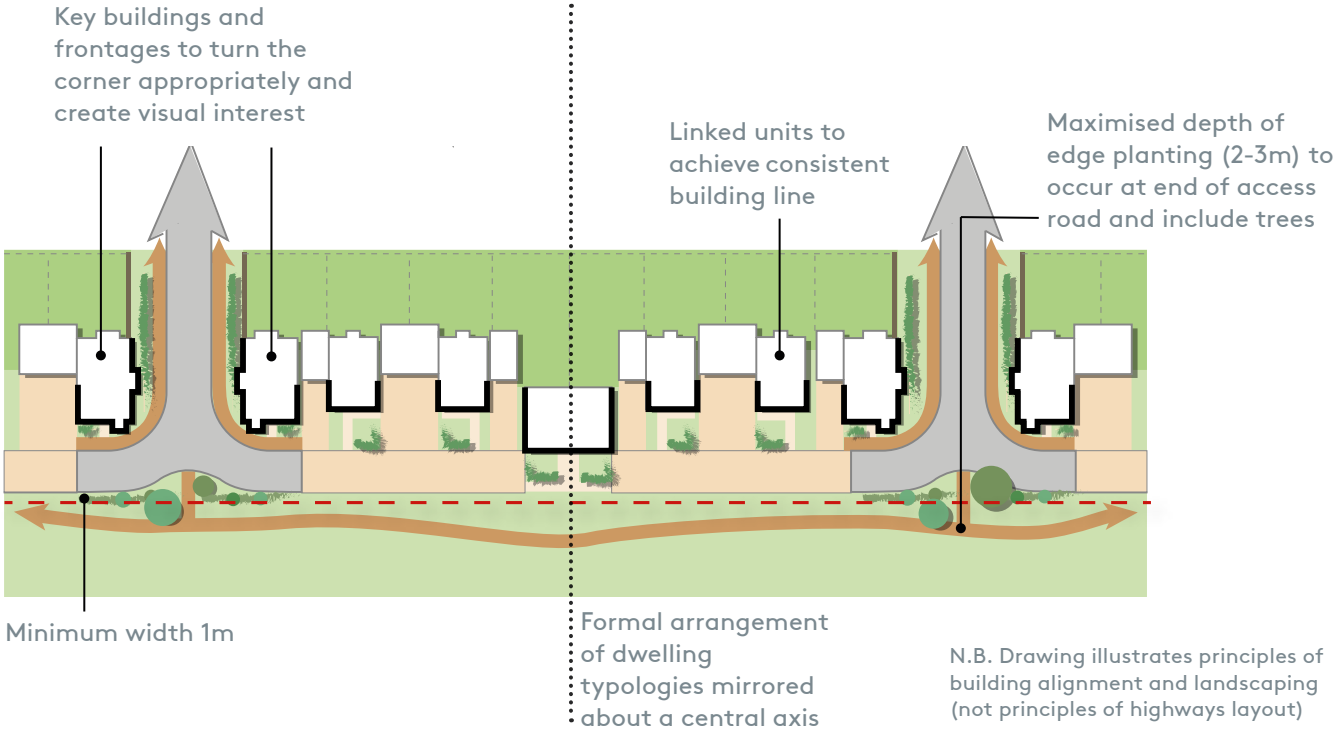


Fig 5.24 : Illustrative Example of Southern Edge Frontage Character

MANDATORY KEY PRINCIPLES

- No repetition of dwelling typologies over more than two adjoining plots.
- Ridgelines to be parallel or perpendicular (i.e. gables) to the prevailing building line, varying between the two.
- Key buildings and frontages that positively address the public realm to be utilised on all corners where roads connect to the parcel edge.
- Windows or bays at ground and first floor to be included on flank walls alongside driveways.
- Access roads to be designed to minimise their visual impact along the park edge, with private driveways used where appropriate.
- Clusters of planting to be positioned within the parcel boundary where turning heads are provided along wildlife corridors and green spaces (refer to Section 3.5 for details on design principles and landscaping). Trees must be planted on parcel boundaries at the end of access roads where they form a turning head / meet private drives.
- Roads will be set back from the development boundary by a minimum of 1m to allow for landscaping to blend in with the adjacent wildlife corridor or green space (in compliance with planting strategy described in section 3.12)
- Materials will be selected from a limited palette to ensure a coherent character, with a clear and prevailing primary wall material of red brick.
- High quality surface finishes to be used on public realm. (For library of public realm materials, refer to palette in section 3.8)
- When addressing corners, priority frontage should be for one which provides greater formality.

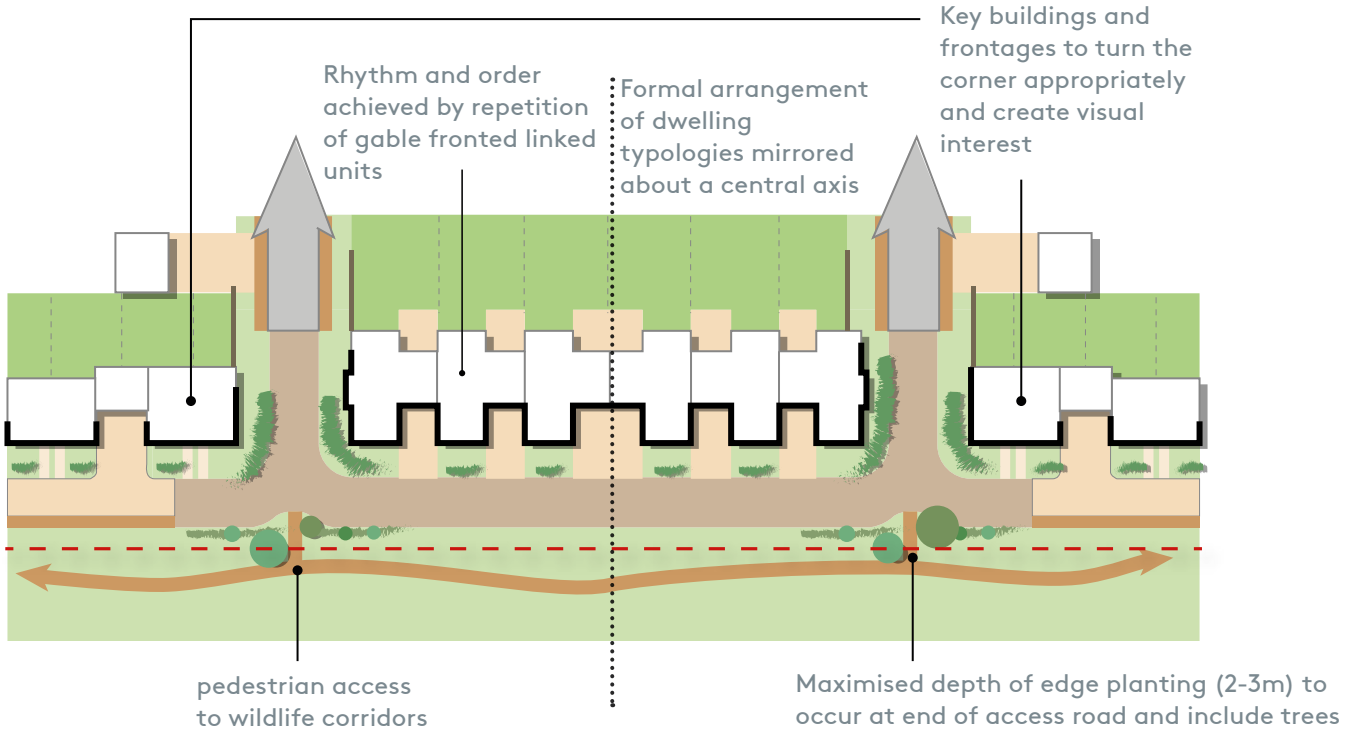
COMPONENT	ILLUSTRATION	NOTES
Building Typologies	D2, D4, D5, SD1, SD2, SD3, SD4, SD5	(For library of dwelling typologies refer to section 5.12)
Parking Arrangements	P1 (inc. other variants), P2, P3 (inc. other variants), P5	• Where P1 type is used, parking spaces must be set behind the building line. (For library of parking typologies refer to section 5.13)
Boundary Treatments	B3, B5, B6	• Boundary wall to use the same primary wall material of the associated dwelling. (For library of boundary typologies refer to section 5.14)
Set-back	2-3m	• Set backs to vary to achieve an irregular building line.
Materials	Walls - Primary: Red stock brick Walls - Accent: Timber - Grey/ black; Buff stock brick; Render - White / Ochre Roofs: Gray Slate tiles; Orange/red tiles red tiles; Dark red tiles Balconies: Timber - Natural; Powder coated / painted steel Windows: Grey-Green; Natural; Dark grey - black	• Accent materials to be used sparingly on marker or key buildings and frontages • Roofs of outbuildings (including garages) will utilise the same primary roof material as the dwelling with which they are associated • Thin leading edge roof tiles only. • Walls to outbuildings (including garages) will either utilise the same primary wall material as the dwelling with which they are associated, or weatherboarding where this would result in an improvement in the design. (For detailed guidance on building features and principles of material application refer to section 5.10-5.11)

5.7.7 Frontage Character D: District Centre Interface & Central Wildlife Corridor

The frontage character overlooks central wildlife corridors and future District Centre. Residential development will respond to wildlife corridors with a high degree of enclosure to frame the linear spaces. A formal arrangement of dwellings will be positioned along the linear edges, providing a positive frontage to, and natural surveillance of, the public spaces. The permitted variety of dwelling types and materials is intended to establish an urban character that is coherent by using complementary dwelling typologies.

Fig 5.25: Frontage Character D Key Plan

STREET COMPONENT	PERMITTED TYPES	NOTES (M)
Building Line	1.A Linear	• All primary elevations to face outward, over the parcel edge. • Buildings to have a consistent set-back.
Spacing between buildings	2.A Consistent	• Spacing between buildings to be minimised but no less than 2.1m. • Dwellings and garages to be connected with solid walls.
Building alignment / orientation	3.A Parallel to street	
Edge Planting	4.A Perimeter Landscaping	• This edge planting varies between 1 - 3m depth grass verge including landscape elements. Tree planting to be provided where turning heads are proposed. • The landscape planting to blend with the adjacent green space.



N.B. Drawing illustrates principles of building alignment and landscaping (not principles of highways layout)

Fig 5.26: Illustrative Example of District Centre Interface Frontage Character

MANDATORY KEY PRINCIPLES

- The number of building typologies featured along this frontage will be limited so as to define a character of repetition / rhythm / order.
- Significant majority of ridgelines to be perpendicular (i.e. presenting gables) to the prevailing building line.
- Key buildings and frontages that positively address the public realm to be utilised on all corners where roads connect to the parcel edge.
- Windows or bays at ground and first floor to be included on flank walls alongside driveways.
- A contiguous frontage is to be achieved through appropriate spacing of buildings and the use of brick walls linking them to garages and each other.
- Access roads to be designed to minimise their visual impact along the wildlife corridor edge, with private driveways used where appropriate.
- Clusters of planting to be positioned within the parcel boundary where turning heads are provided along wildlife corridors and green spaces principles and landscaping). Trees must be planted on parcel boundaries at the end of access roads where they form a turning head / meet private drives.
- Roads will be set-back from the development boundary by a minimum of 1m to allow for landscaping to blend in with the adjacent wildlife corridor or green space (in compliance with planting strategy described in section 3.12).
- The boundary treatment along the frontage will be consistent and match the primary brick material of the dwellings.
- Materials will be selected from a limited palette to ensure a coherent character, with a clear and prevailing primary wall material of red brick.
- High quality surface finishes to be used on public realm. (For library of public realm materials, refer to palette in section 3.8)
- When addressing corners, priority frontage should be for one which provides greater formality.

COMPONENT	ILLUSTRATION	NOTES
Building Typologies	D2, D4, D5, SD1, SD4, SD5	(For library of dwelling typologies refer to section 5.12)
Parking Arrangements	P1 (inc. other variants), P2, P3 (inc. other variants), P6	• Where P1 type is used, parking spaces must be set behind the building line. (For library of parking typologies refer to section 5.13)
Boundary Treatments	B3, B4, B5	• Boundary wall to use the same primary wall material of the associated dwelling. (For library of boundary typologies refer to section 5.14)
Set-back	2-3m	
Materials	Walls - Primary: Red stock brick Walls - Accent: Timber - Grey/ black; Buff stock brick; Render - White / Ochre; ★ Light/Dark brick Roofs: Gray Slate tiles; Orange/red tiles red tiles; Dark red tiles Balconies: Timber - Natural; Powder coated / painted steel Windows: Grey-Green; Natural; Dark grey - black	• Accent materials to be used sparingly on marker or key buildings and frontages. • Roofs of outbuildings (including garages) will utilise the same primary roof material as the dwelling with which they are associated. • Thin leading edge tiles only. • Walls to outbuildings (including garages) will either utilise the same primary wall material as the dwelling with which they are associated, or weatherboarding where this would result in an improvement to the design of the scheme. ★ Light/ dark brick to be used only on the edges identified on the key plan. (For detailed guidance on building features and principles of material application refer to section 5.10-5.11)

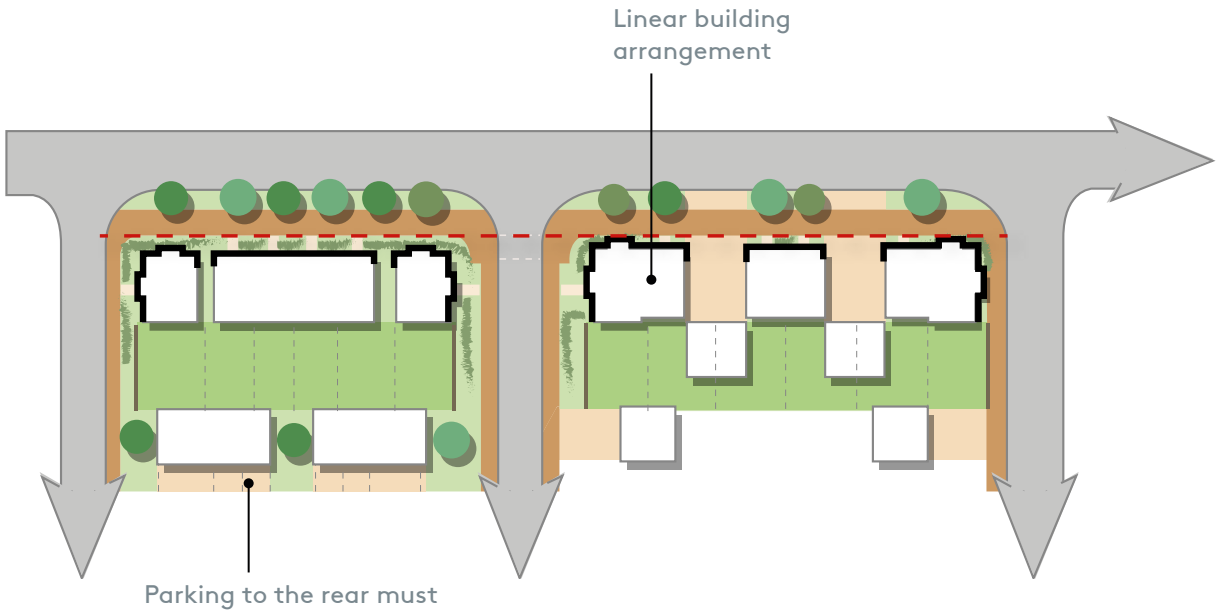
5.7.8 Frontage Character E: Secondary Street

Residential development along the Secondary Street will contrast to parcel edges fronting on to open space, being characterised primarily by narrow, gable-fronted, terraces, detached and semi-detached dwellings, organised in groups of a similar typology. Apartment blocks will be expected at the eastern end of the secondary street as illustrated in Key Group 5.6.2. Dwellings will be set out with a consistent set-back and spacing, creating a frontage that clearly expresses rhythm and order.

While direct access to plots is allowed along the Secondary Street, the occasional parking courts will be accommodated to the rear, and must be designed as overlooked, attractive spaces that incorporate soft landscaping.

Fig 5.27: Frontage Character E Key Plan

STREET COMPONENT	PERMITTED TYPES	NOTES (M)
Building Line	1.A Linear	• All primary elevations to face outward, over the parcel edge • Buildings to have a consistent set-back
Spacing between buildings	2.A Consistent	• Spacing between buildings to be minimised but no less than 2.1m.
Building alignment / orientation	3.A Parallel to street	
Edge Planting	N / A	• Private plots abut the edge of the Secondary Road highways corridor, front garden depths set out in set back on following table



N.B. Drawing illustrates principles of building alignment and landscaping (not principles of highways layout)

Fig 5.28: Illustrative Example of Secondary Street Frontage Character

MANDATORY KEY PRINCIPLES

- The number of building typologies featured along this frontage will be limited so as to define a character of repetition / rhythm / order.
- Terraced housing must be included as part of the selected mix of housing typologies.
- Building spacing will be regular and set out as so to achieve enclosure and rhythm along the building line.
- Significant majority of ridgelines to be perpendicular (i.e. presenting gables) to the prevailing building line.
- Key buildings and frontages that positively address the public realm to be utilised on all corners where roads connect to the parcel edge.
- Windows or bays at ground and first floor to be included on flank walls alongside driveways.
- Hedge and tree planting will feature to all plot frontages and in its arrangement will emphasise the rhythm and order intended along this frontage.
- Materials will be selected from a limited palette to ensure a coherent character, with a clear and prevailing primary wall material of red / buff brick.
- High quality surface finishes to be used on public realm. (For library of public realm materials, refer to palette in section 3.8)
- When addressing corners, priority frontage should be for one which provides greater formality.
- The proposed electricity substation should be integrated with the adjacent residential development as best as possible in terms of appearance and so it accords with the proposed building line arrangement for this part of the site. A minimum separation of 3m, including appropriate landscaping in accordance with GTC requirements, between a substation and adjacent residential development should be achieved.

COMPONENT	ILLUSTRATION	NOTES
Building Typologies	D2, D4, D5, SD1, SD5, T1, F1	• Flat blocks (F1) should only be used on prominent locations on junctions / within Key Groupings. (For library of dwelling typologies refer to section 5.12)
Parking Arrangements	P1 (inc. other variants), P5, P9, P10 (inc. other variants)	• Where P1 type is used, parking spaces must be set behind the building line (For library of parking typologies refer to section 5.13)
Boundary Treatments	B3, B4, B5, B8	• Boundary wall to use the same primary wall material of the associated dwelling • B8 - to be placed to the back of footpath alongside the public highway boundary (For library of boundary typologies refer to section 5.14)
Set-back	2-3m	
Materials	Walls Primary: Red stock brick; Buff stock brick Walls - Accent: Timber - Grey/ black; Light/Dark brick; Render - White / Ochre Roofs: Gray Slate tiles; Orange/red tiles red tiles; Dark red tiles Balconies: Timber - Natural; Powder coated / painted steel Windows: Grey-Green; Natural; Dark grey - black	• Accent materials to be used sparingly on marker or key buildings and frontages • Roofs of outbuildings (including garages) will utilise the same primary roof material as the dwelling with which they are associated • Thin leading edge roof tiles only • Walls to outbuildings (including garages) will either utilise the same primary wall material as the dwelling with which they are associated, or weatherboarding where this would result in an improvement in the design of the scheme. (For detailed guidance on building features and principles of material application refer to section 5.10-5.11)

5.7.9 Frontage Character F: Primary Street

Residential development along this frontage will create a strong enclosure addressing the significant movement corridor along the Primary Street. Dwellings will create near continuous frontages to provide a formality and rhythm along the Primary Street characterised primarily by blocks of apartments, terraced or linked houses, townhouses as well as semi-detached and detached dwellings where shared drives are provided– all presenting gable fronts to this significant movement corridor.

Some car parking will be accommodated to the rear as plots cannot be accessed directly from the Primary Street. Where incorporated, parking courts must be designed as overlooked, attractive spaces that incorporate soft landscaping. Shared driveways serving up to 6 dwellings will also be required: dwellings in these instances must create symmetrical groupings with a stepped building line.

Fig 5.29: Frontage Character F Key Plan

STREET COMPONENT	PERMITTED TYPES	NOTES (M)
Building Line	1.A Linear 1.B Stepped	• Set backs to all dwellings to be consistent except for when access is via a shared driveway, in which 'book-end' buildings to groupings can step forward.
Spacing between buildings	2.A Consistent	• Spacing between buildings to be minimised but no less than 2.1m.
Building alignment / orientation	3.A Parallel to street	
Edge Planting	4.B Neighbourhood Street Planting	• Only applicable when vehicular access to plots is via a shared driveway, whereby a 1.5m verge with hedge is required to separate the edge of the highways corridor (i.e. back of footpath/ cycleway) and the shared driveway.

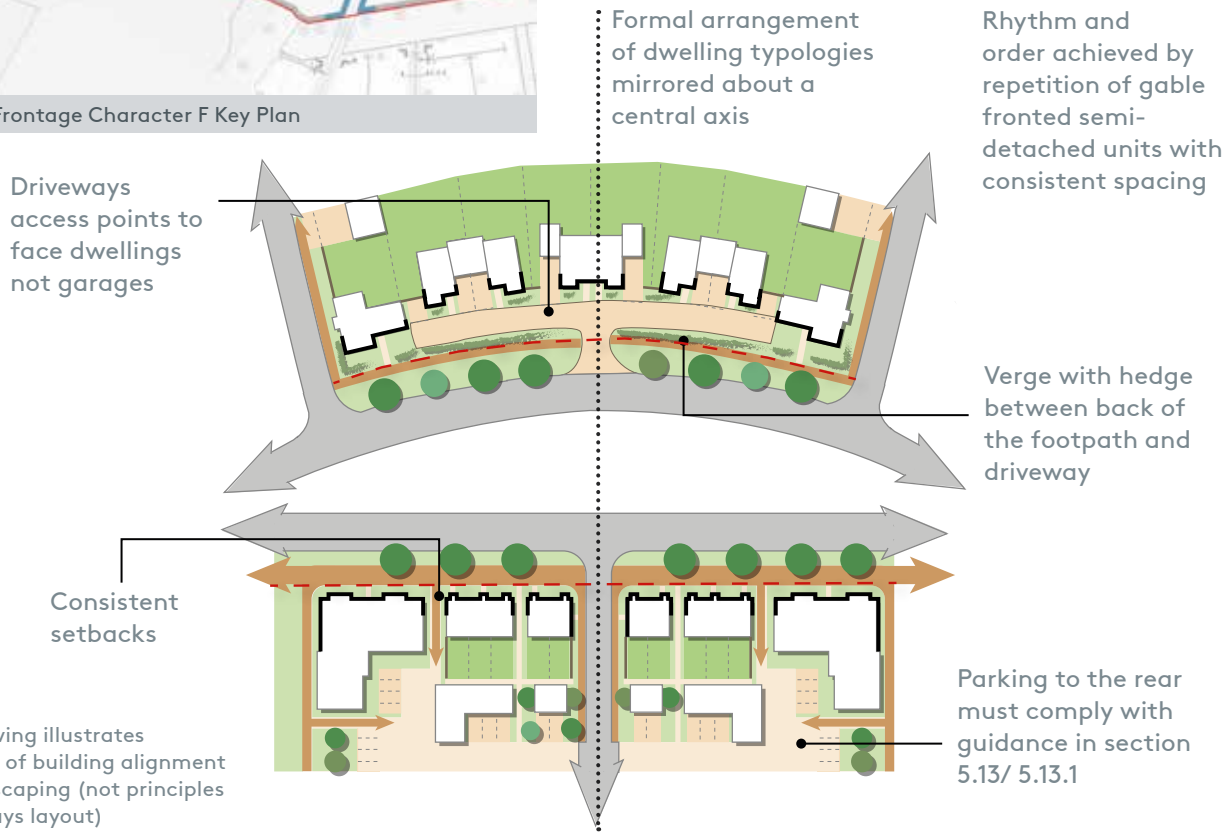


Fig 5.30: Illustrative Examples of Primary Street Frontage Character showing vehicle access from shared drive (top) or parking to the rear (bottom)

MANDATORY KEY PRINCIPLES

- The number of building typologies featured along this frontage will be limited so as to define a character of repetition / rhythm / order.
- Building spacing will be regular and set out as so to achieve enclosure and rhythm along the building line.
- Ridgelines to be perpendicular (i.e. forming gables) to the prevailing building line.
- Key buildings and frontages that positively address the public realm to be utilised on all corners where roads connect to the parcel edge.
- Windows or bays at ground and first floor to be included on flank walls alongside driveways.
- Hedge and tree planting will feature to all plot frontages and in its arrangement will emphasise the rhythm and order intended along this frontage.
- Where dwellings are grouped along private driveways their grouping will be symmetrical, and formal shrub / tree planting will occupy the margin between the drive and the Primary Street.
- Materials will be selected from a limited palette to ensure a coherent character, with a clear and prevailing primary wall material of red / buff brick.
- High quality surface finishes to be used on public realm. (For library of public realm materials, refer to palette in section 3.8)
- When different Frontage Characters meet at a corner (of a parcel or at a junction) the more formal Frontage Character should be taken to prevail around that corner.

COMPONENT	ILLUSTRATION	NOTES
Building Typologies	D2, D4, D5, SD1, SD4, SD5, T1, F2	• Flat blocks (F1) should only be used on prominent locations on junctions / within Key Groupings. • Larger buildings to define corners. (For library of dwelling typologies refer to section 5.12)
Parking Arrangements	P1 (inc. other variants), P5, P9, P10 (inc. other variants)	• Where P1 type is used, parking spaces must be set behind the building line • Where rear parking courts are considered they will adhere to the mandatory principles set out in section 5.13.1 (For library of parking typologies refer to section 5.13)
Boundary Treatments	B2, B4, B6*, B8*	• Boundary wall to match brick colour of associated dwelling • *B6 - B8 - to be placed to the back of footpath alongside the public highway boundary. (For library of boundary typologies refer to section 5.14)
Set-back	2-3m	
Materials	Walls - Primary: Red stock brick; Buff stock brick Walls - Accent: Timber - Grey/ black; Light/Dark brick; Render - White / Ochre Roofs: Gray Slate tiles; Orange/red tiles red tiles; Dark red tiles Balconies: Timber - Natural; Powder coated / painted steel Windows: Grey-Green; Natural; Dark grey - black	• Accent materials to be used sparingly on marker or key buildings and frontages • Roofs of outbuildings (including garages) will utilise the same primary roof material as the dwelling with which they are associated • Thin leading edge roof tiles only • Walls to outbuildings (including garages) will either utilise the same primary wall material as the dwelling with which they are associated, or weatherboarding where this would result in an improvement in the design of the scheme. (For detailed guidance on building features and principles of material application refer to section 5.10-5.11)

5.8 URBAN DESIGN PRINCIPLES

The eleven principles set out on the following pages will be adhered to in all Reserved Matters Applications. These principles are set out to ensure designs provide a coherent framework of well-designed streets and spaces, defined by appropriate building typologies.

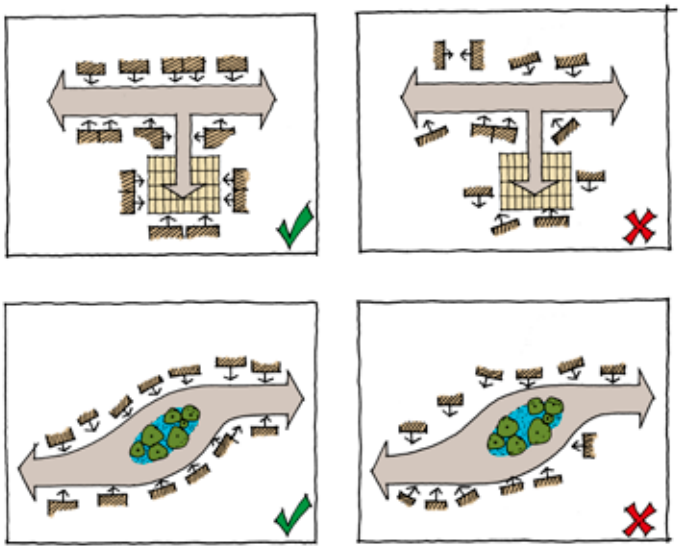
5.8.1 Residential Layout Principles

M

RESIDENTIAL PARCEL LAYOUT PRINCIPLES

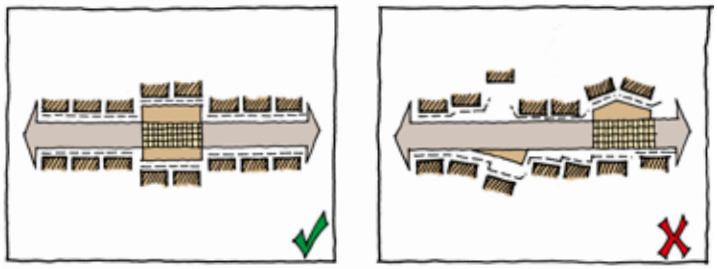
5.8.1.A BUILDING ORIENTATION WILL RELATE TO ROUTES AND SPACES

- Buildings must directly face routes and spaces such that their primary frontage is parallel to the edge of that route or space.
- Buildings should not be positioned at an angle to the back-of-footpath line, or to the defined edge of a shared surface.
- For informal arrangements the dwelling must still align to the immediate edge of the route or space it faces.
- Primary entrances to buildings, or to entrance courtyards serving buildings, must be visible from the public realm.



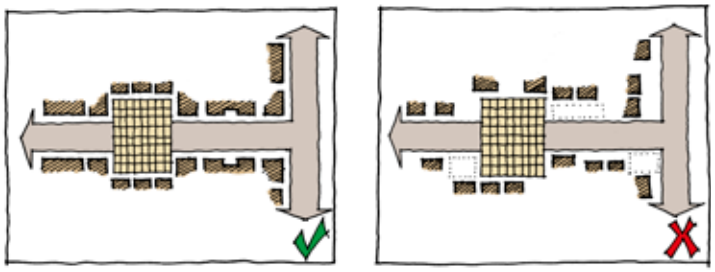
5.8.1.B BUILDING ALIGNMENT WILL BE COHERENT

- Building frontages must establish a common building line where they face routes or linear spaces (except in areas of lowest density with informal frontages), where some departure from this principle is permitted).
- Set-backs from an established building line will be in accordance with the permitted dimensions stated in the Frontage Character Typologies (see Section 5.7).
- Rear and flank walls of garages and outbuildings may be considered as components in establishing a common building line.
- Except in instances where a fundamentally different design approach is specified in the Frontage Characters section or otherwise proposed and justified, the distance between building frontage and back of footpath should be minimised (but a buffer privacy strip of minimum 1m, including landscaping, maintained).



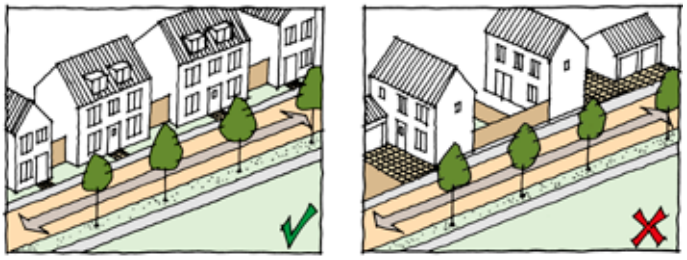
5.8.1.C CONTINUITY AND ENCLOSURE WILL BE ACHIEVED

- All frontages along streets and spaces must be designed to create clear definition through legible continuity of building form, linkage and positioning.
- Public and private space must be clearly distinguished through continuity of frontage.
- 'Semi-public' space arising from lack of continuity or enclosure must be avoided.
- Detached, semi detached and end of terrace dwellings must nonetheless be clearly detached, with a minimum of 2m clear between flank walls.



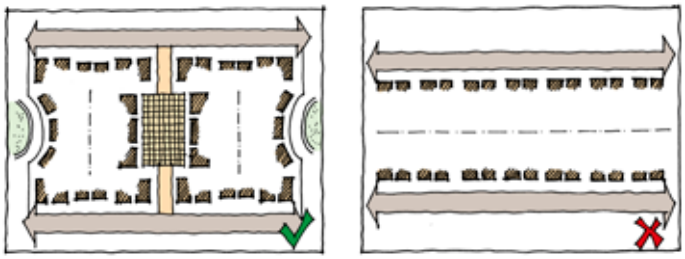
5.8.1.D ROUTES AND SPACES WILL BE ADDRESSED BY ACTIVE FRONTAGE

- Routes and spaces must be overlooked by windows to habitable rooms at ground and first floor levels, facilitating natural surveillance.
- Blank elevations largely devoid of windows must be avoided where they face – or are clearly visible from – the public realm.
- Active frontage should be enhanced through the use of balconies at first floor level, glazing within or alongside primary entrances, and full height projecting bays on flank elevations where appropriate (see below Section 5.3.1.E Corners and Plot Sides will be Positively Solved).



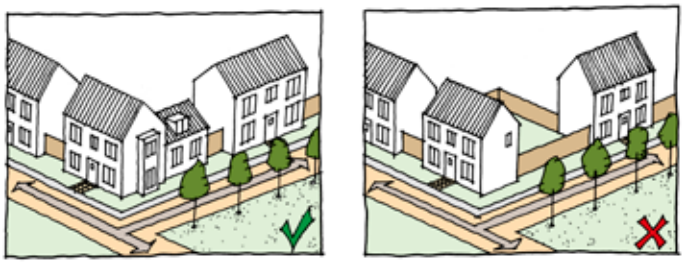
5.8.1.E GROUPINGS WILL FORM COMPONENTS OF THE LAYOUT

- Opportunities within development parcels to configure dwellings in identifiable groupings that define spaces of a certain character / function must be identified and taken.
- Groupings will be discernible either as 'clusters' of buildings around a shared space, or configurations that face and define a particular space to their front.
- Groupings will generally occur in areas of lower density or centrally within development parcels (i.e. away from primary routes and spaces where greater continuity of frontage is expected).



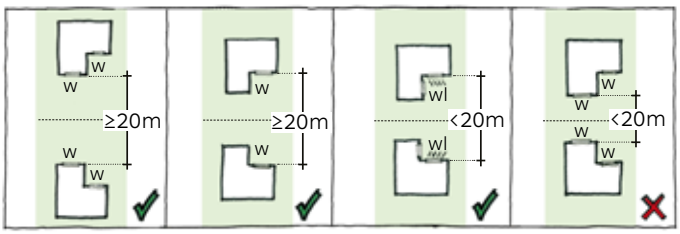
5.8.1.F CORNERS AND PLOT SIDES WILL BE POSITIVELY SOLVED

- All buildings located on identifiable corners (where two routes, two spaces, or a route and a space meet) must positively address both directions through positioning of entrances, generous windows to habitable rooms, glazed bays /projections and upper level balconies where appropriate.
- Building form will respond to defined corner locations through the tallest or largest element of the building mass being located directly on that corner.
- Buildings L-shaped in plan should be positioned on defined corner locations.
- Where a corner plot forms the end of a row of street-facing dwellings, the dwelling on that corner plot will have its primary entrance positioned on its flank elevation.



5.8.1.G PRIVACY WILL BE MAINTAINED

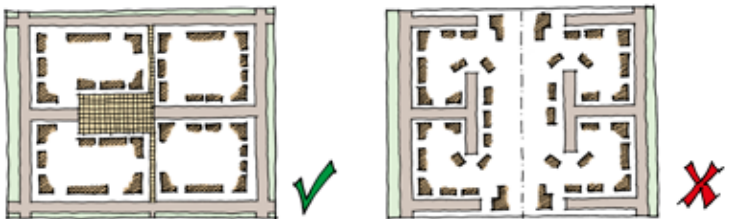
- Direct views from dwellings into dwellings through windows on their rear and flank elevations will be avoided, either by separation of >20 metres (properties back-to-back) or through detailed design measures.
- Appropriate design measures in higher density areas, include use of opaque glazing or louvres, the angling or positioning of windows to avoid direct sightlines, and the use of full height screening to courtyards or terraces.
- No habitable room will be served only by windows comprising opaque glass.



w = window, wl = window with privacy louvres or opaque glass

5.8.1.H CONNECTIONS AND PERMEABILITY WILL BE INTEGRATED THROUGHOUT THE LAYOUT

- Pedestrian and cycle routes must be interconnected and not lead to dead-ends.
- Where vehicular routes reach a terminating space pedestrian routes must continue beyond that space and connect to the nearest public route or space.
- Rigid 'hammerhead' road arrangements must be avoided.
- Parking courts serving two or more dwellings must either be gated or offer a clear through-route to pedestrians.

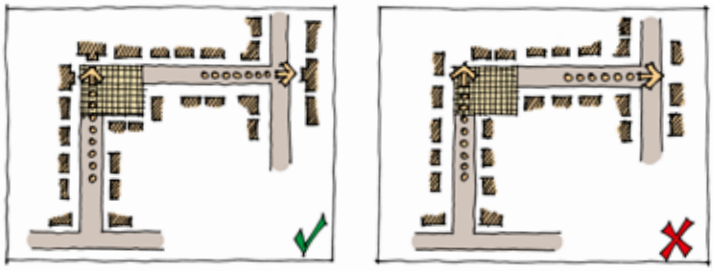


5.8.1.I CAR PARKING WILL HAVE MINIMAL VISUAL IMPACT

- All development parcels must utilise a variety of parking solutions and not rely on just one or two methods of accommodating cars.
- On-plot parking must be positioned such that parked cars do not sit forward of the common building line where a layout has established street continuity (in lower density areas with larger plots it may be acceptable for on-plot parking to be positioned forward of the dwelling frontage).
- All private parking spaces must be located with easy access to the dwellings they serve
- In no instance shall a group of more than four parking spaces be proposed without sub-division by a landscape strip of minimum 1.5m.
- Further guidance on parking courts is set out in Section 5.13 and Section 5.13.1.
- On-street parking, parallel to the carriageway, shall be laid out such that no more than two spaces are joined without sub-division by an area of landscape and sufficient space for planting of at least one street tree.

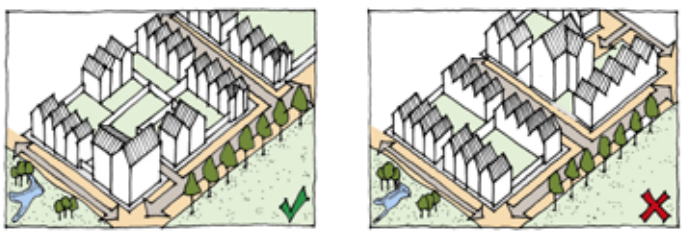
5.8.1.J VISUAL STOPS WILL BE ESTABLISHED

- Where linear spaces or routes establish a vista, that vista will either end in a defined public open space or be terminated by a 'visual stop'.
- A 'visual stop' may be a carefully positioned marker building or landmark, or a prominent landscape feature.
- Vistas must not terminate in a view of, for example, a private driveway or garage door, or the side boundary wall to a plot.



5.8.1.K APARTMENT BLOCKS OF 3 OR MORE STOREYS WILL BE LOCATED ON PARCEL EDGES / CORNERS

- Apartment blocks of 3 or more storeys will be positioned to address primary routes on the edges of any given parcel, with the exception of where key spaces are contained within a parcel.
- Proposals will comply with heights parameter plan (refer to Section 1.3).



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URBAN DESIGN PRINCIPLES

5.8.2 Residential Streetscene Principles

The following ten mandatory architectural principles will be adhered to, in order to achieve a coherent, yet distinctive character to the architectural design of dwellings.

M

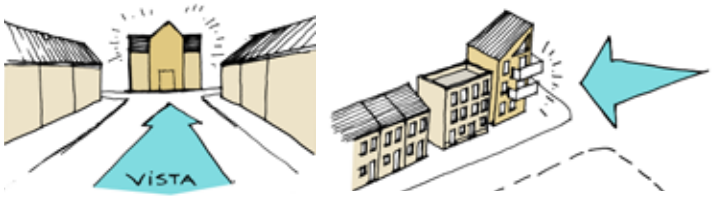
RESIDENTIAL PARCEL LAYOUT PRINCIPLES

5.8.2.A RECOGNISABLE FORM

Proposals will follow the gradation from formal to informal built form as demonstrated in the Frontage Characters plan. This will be achieved by using appropriate and recognisable forms which relate to the relevant character.

5.8.2.B LANDMARK

- Landmark buildings will:
  - Mark the end of vistas or long views;
  - Address prominent corners; and
  - Frame key views.
- A landmark building can demonstrate key features such as projecting bays, large window openings, balconies and expressive roof forms.

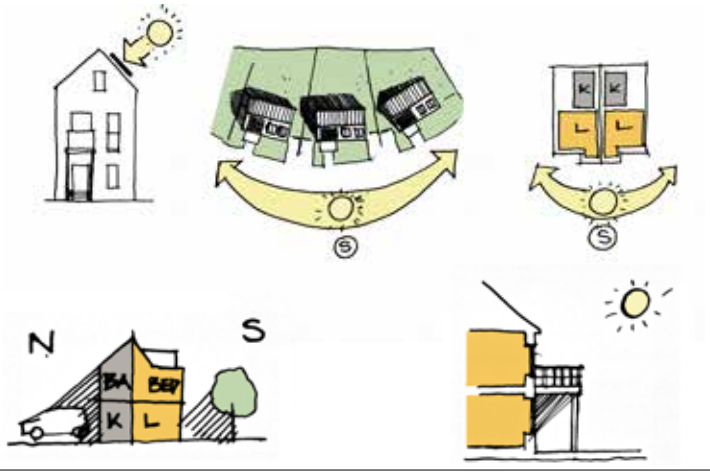


5.8.2.C SILHOUETTE

- Dwellings will create unified and articulated silhouettes through repetitive roof forms within terraces and groupings of dwellings. This can be achieved, for example, through the use of gables.

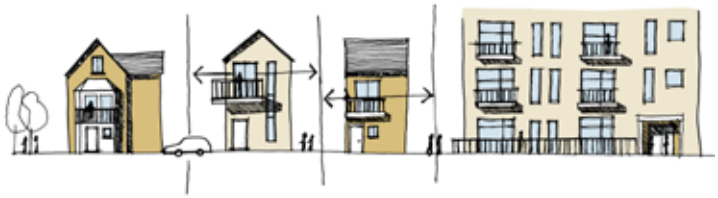
5.8.2.D ASPECT & ORIENTATION

- Dwellings will maximise the potential for roof pitches to face south.
- Where possible, dwellings will maximise potential for south / south-west facing habitable rooms.
- Dwellings will show consideration of solar shading principles to provide a comfortable habitable environment.



5.8.2.E ANIMATE FRONTAGE ADDRESSING PUBLIC REALM

- Dwellings which front the public realm will maximise the potential for active frontages and provision for balconies.
- This will provide natural surveillance and assist in creating animation along the street scene.



5.8.2.F CREATE ORDER AND UNITY

- Variety will be achieved through handed, framed and repeated elements but groupings of dwellings forming street scenes must achieve order and unity within their overall layout and composition.

5.8.2.G EXPRESS INDIVIDUALITY OF LINKED & TERRACED DWELLINGS

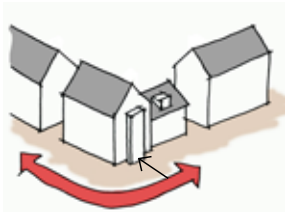
- Dwellings which form part of a terrace or grouping of buildings will express individuality through celebrating entrances and openings.
- This can also be achieved, for example, through alternating features such as projecting elements or set back elements within the composition of a group of linked dwellings.

5.8.2.H CELEBRATE ENTRANCES

- Entrances to dwellings will add definition and create interest to the front elevation.
- Entrances will be provided with some form of shelter.

Double height porch & loggia with gable highlighting entrance

Porch 'cut-out' of plan provides visual interest as well as shelter



Entrance to corner turning home on the side elevation

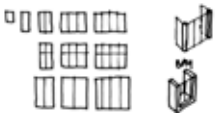
5.8.2.I CLARITY AND RATIONALE

- Dwellings will match the description of their typology as set out in Section 5.12.
- Dwellings will utilise simple forms and masses both individually and within a grouping of buildings.
- Dwelling features will be simple and expressive of the purpose they serve, e.g. usable balconies.
- The use of materials will clearly demonstrate a rationale and may distinguish key elements of the dwelling such as projecting bays.

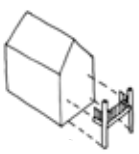
Simple wide fronted unit with subservient elements e.g. garage, bay window, porch, etc.

Gable used to provide shelter to loggia and bay

Simple vertical fenestration detailing



Simple Window Palette; Used to form other elements



Simple form with clip on elements – Bay, porch, loggia

5.9 INNER PARCELS CHARACTER AREAS

Three inner parcel character areas have been identified for Key Phase 4. Their features have been defined in order to ensure:

- the harmonious relationship between parcel frontages and their internal areas;
- Consistent quality through neighbourhoods and streets away from key routes and spaces;
- a distinctive, location-specific response which reflects the gradual increase in density from outer key phases towards the district centre; and
- the coherence of the entire key phase.

The character area guidance refers to the internal areas of parcels. Applicants will need to demonstrate compliance with the principles set out for each character area. The principles pertain to the following:

- Built form: heights and general building guidance which are appropriate to the required density within residential parcels;
- Street patterns: the character of secondary and tertiary streets;
- General material guidance.

Fig 5.31: Inner Parcels Character Areas Key Plan

5.9.1 Clifton Brook South

Guiding Character Area Design Principles

The Clifton Brook Character Area occupies the northern residential parcels of Key Phase 4; It displays a long interface with the Central Neighbourhood character area immediately to the south. Whilst urban in character, it is the lowest density character area within KP4 and the housing mix shall include predominantly 3-4 bed homes. Proposals should adhere to the following principles:

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Typologies and building heights

- Dwellings will be predominantly 2 and 2.5 storeys, with key corners and frontages featuring the occasional 3 storey buildings wherever possible;
- Across the Character Area, a range of homes is encouraged, whereby detached and semi-detached houses should predominate, with occasional groups / clusters of terraced homes defining mews spaces or courts within parcels, achieving a variety in character;
- Detached homes – or pairs of homes in an L-shaped configuration - should always be used on key corners and in prominent locations to terminate long vistas.

Street pattern

- Streets must be designed to minimise exposure of flank walls of dwellings to the public realm, and to avoid staggered arrangements of dwellings non-perpendicular to the line of the street;
- Streets must be designed to incorporate tree planting wherever possible.
- The arrangement of streets must achieve clear building lines and definition of routes, while avoiding a regimented and orthogonal street pattern: occasional softening of building lines incorporating incidental green spaces is expected;
- A variety of tertiary street types should be created across the Character Area, but with a hierarchy of routes clearly expressed through street design and materials;
- A series of mews spaces may be created within the inner parcel areas, with consistent approaches to material selection and housing typologies within these areas;
- A variety of parking strategies should be employed to avoid car dominated streets. (refer to parking typologies library, Section 5.13)

Materials

- Proposed materials for areas located within residential parcels need to demonstrate a consistent approach with their associated frontages;
- If a parcel has multiple, differing frontages to respond to, a rationale demonstrating the transition between the internal areas of the parcel and its edges is required;
- The design rationale for the application of materials must be demonstrated on a materials strategy plan accompanied by street elevations and explanatory text.

Fig 5.32: Clifton Brook South Character Area Key plan

A variety of housetypes along a tertiary street

Softening of building lines to incorporate incidental green spaces

5.9.2 Central Neighbourhood

Guiding Character Area Design Principles

The Central Neighbourhood Character Area is the largest identified such area within Key Phase 4; it occupies the central areas of KP4 and displays a long interface with the Clifton Brook character area immediately to the north. It is characterised by the increase in density compared to Clifton Brook South, and the housing mix shall include predominantly 2-3 bed homes, therefore proposals should adhere to the following principles:

Typologies and building heights

- Dwellings will be predominantly 2 and 2.5 storeys, with key corners and frontages featuring 3 storeys wherever possible;
- Predominantly semi-detached and terraced houses should be proposed;
- Terraced homes should provide enclosure and definition to secondary and tertiary streets;
- Semi-detached homes arranged in coherent, regularly-spaced alignments with limited stepping in the building line may also be used along streets and spaces;
- Detached homes may only be used on key corners and in prominent locations to terminate vistas;
- Homes should be grouped in repetitive or symmetrical arrangements in order to achieve rhythm and order, reading as handed pairs, or symmetrical 'set pieces' of 4, 6 or 8 dwellings.

Street pattern

- A formal arrangement of streets must be achieved, with occasional softening or instances of informal layout responding to nodes and incorporating traffic calming measures:;
- A variety of tertiary street types should be created across the Character Area, but with a hierarchy of routes clearly expressed through street design and materials;
- A series of mews spaces may be created within the inner parcel areas, with consistent approaches to material selection and housing typologies within these areas;
- A variety of parking strategies should be employed to avoid car dominated streets;
- Where parking is provided to the front of dwellings, perpendicular to the street, no more 8 spaces, in groups of 4, separated by soft landscaping will be permitted and only on one side of the street.

Materials

- Proposed materials for areas located within residential parcels need to demonstrate a consistent approach with their associated frontages;
- If a parcel has multiple, differing frontages to respond to, a rationale demonstrating the transition between the internal areas of the parcel and its edges is required;
- The design rationale for the application of materials must be demonstrated on a materials strategy plan accompanied by street elevations and explanatory text.

Fig 5.33: Central Neighbourhood Character Area Key plan

Repeated dwelling types creating interest in the streetscene through unified and articulated silhouettes of repetitive roof forms

Terraces provide a high degree of enclosure and rich variety along streets

5.9.3 Normandy Hill North

Guiding Character Area Design Principles

The Normandy Hill North Character Area occupies the majority of the southern residential parcels within Key Phase 4; it's its location directly west of the District Centre entails that a more urban character is required than in any parcels previously designed or delivered for Houlton. It is the highest density character area within Key Phase 4 and the housing mix shall include predominantly 1-3 bed homes, therefore proposals should adhere to the following principles:

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Typologies and building heights

- Dwellings will be predominantly 2 and 2.5 storeys, with key corners and frontages featuring 3 storeys wherever possible;
- Predominantly terraces and urban housetypes will be located within the parcels to ensure a high degree of enclosure, with detached or semi-detached dwellings used only on corners;
- A consistent building line is required throughout
- Rhythm and order should be expressed through the repetitive use of housetypes;
- Where back garden are less than 10m deep, alternative amenity space could be provided (ie. first floor terrace) to enable a denser residential layout subject to no detrimental impact on residential amenity, particularly in regard to light, aspect and privacy

Street pattern

- A formal arrangement of streets must be achieved, with an orthogonal street pattern where possible. Occasional stepping of building lines is permitted to respond to particular nodes, landscaped spaces or traffic calming features;
- A variety of tertiary street types should be created across the Character Area, but with a hierarchy of routes clearly expressed through street design and materials;
- A series of mews spaces may be created within the inner parcel areas, with consistent approaches to material selection and housing typologies within these areas;
- A variety of parking strategies should be employed to avoid car dominated streets (refer to parking typologies library, Section 5.13)

Materials

- Proposed materials for areas located within residential parcels need to demonstrate a consistent approach with their associated frontages;
- If a parcel has multiple, differing frontages to respond to, a rationale demonstrating the transition between the internal areas of the parcel and its edges is required;
- The design rationale for the application of materials must be demonstrated on a materials strategy plan accompanied by street elevations and explanatory text.

Fig 5.34: Normandy Hill North Character Area Key plan

Rhythm and order through repetition of built form

Mews street in urban setting: Example of buildings' relation to the street

5.10 RESIDENTIAL MATERIALS APPLICATION

An index of permitted materials has been carefully selected for the residential built form within KP4, covering walls, roofs, windows and balconies. This is shown on the facing page. From this, a palette of a select few materials has been specified for each Frontage Character Area, to ensure that neighbourhoods within KP4 have their own identity whilst reading coherently within the wider development. All proposals will demonstrate adherence to the Material Application Principles set out below. Certain materials will be seen across all Frontage Character Areas.

Reserved Matters Applications will only use materials specified in the relevant Frontage Character Area palettes (Section 5.7). A proposed materials specification will be submitted with each Reserved Matters Application, along with samples, for approval by RBC.

Certain locations within the development could support the introduction of contrasting, 'code-breaking' architecture, where a design rationale is developed for a particular building or cluster of buildings. This may extend to the introduction of materials not permitted elsewhere in that character area. Reserved Matters Applications including 'code-breaking' elements must include clearly written design justification for those elements.

Mandatory Materials Application Principles

The following mandatory principles for the application of materials will be adhered to throughout KP4:

- Proposals are to demonstrate consistency in material selection and usage, utilising only materials specified* in the relevant Frontage Character Area palette(s);
- Parcels for Reserved Matters Applications which cover more than one Frontage Character Area will demonstrate a carefully considered transition between differing materials palettes;
- Where materials for individual buildings that contrast with materials of neighbouring buildings are proposed an accompanying design justification will be submitted as part of the Reserved Matters Application;
- Materials will be consistent along a row of terraced dwellings or linked dwellings, including dwellings linked by garages;
- No more than two materials will be used across walls of any given dwelling or block, and where this includes coloured render only one colour will be used;
- Generally only one brick colour/type is to be used on any building (except where a contrasting blue/grey brick is used as a plinth level, up to a maximum of eight brick courses); and
- Proposals will be required to demonstrate consistency of material selection for buildings on both sides of streets, either where a street passes through the parcel itself, or where the parcel faces another completed / consented parcel across a street.
- Thin leading edge roof tiles only.

* Marker buildings (see 5.5.1) may feature materials from outside the relevant palette but will require the submission of specific design justification for approval by RBC and the master developer.

- Clear design approach to use of materials
- Whole of building uses one material, or different material used for specific built elements (front gable and bay window)

- Excessive number of materials
- Illogical and random material changes

- Lack of logic with material changes

- Lack of logic to render positioning

Illustrative Precedents - Suitable Design Solutions

Variation of materials within a limited palette along a single street

Refined palette of materials with clear logic to their application

No more than two materials used across the facade

Brick detailing should be simple and match the main brick colour

5.11 PLOT AND BUILDING FEATURES

As set out in the introduction to this chapter, Key Phase 4 aims to deliver a high quality housing development.

Proposals should achieve this through generally according with the following principles:

Plot & Building Features principles

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- Richness and texture in primary materials, principally brick;
- Generosity in window openings through their size / proportions, and the minimised intrusion of framing within apertures;
- Buildings in prominent locations that reflect their prominence through unique elements of design, ones that contrast with, whilst complementing, calm and ordered neighbouring buildings;
- External entrance thresholds clearly defined by robust boundary treatments designed as part of the building and that give the streetscape continuity;
- Key building components such as windows, doors, rainwater goods, and roof details will all be resolved in a way that demonstrates quality; and
- Wherever possible, using sustainable supply chains for products and materials.

Five key components of the dwelling plot are identified in the diagram below. A series of specific design principles for each of these are set out on the following pages, in addition to those set out above.

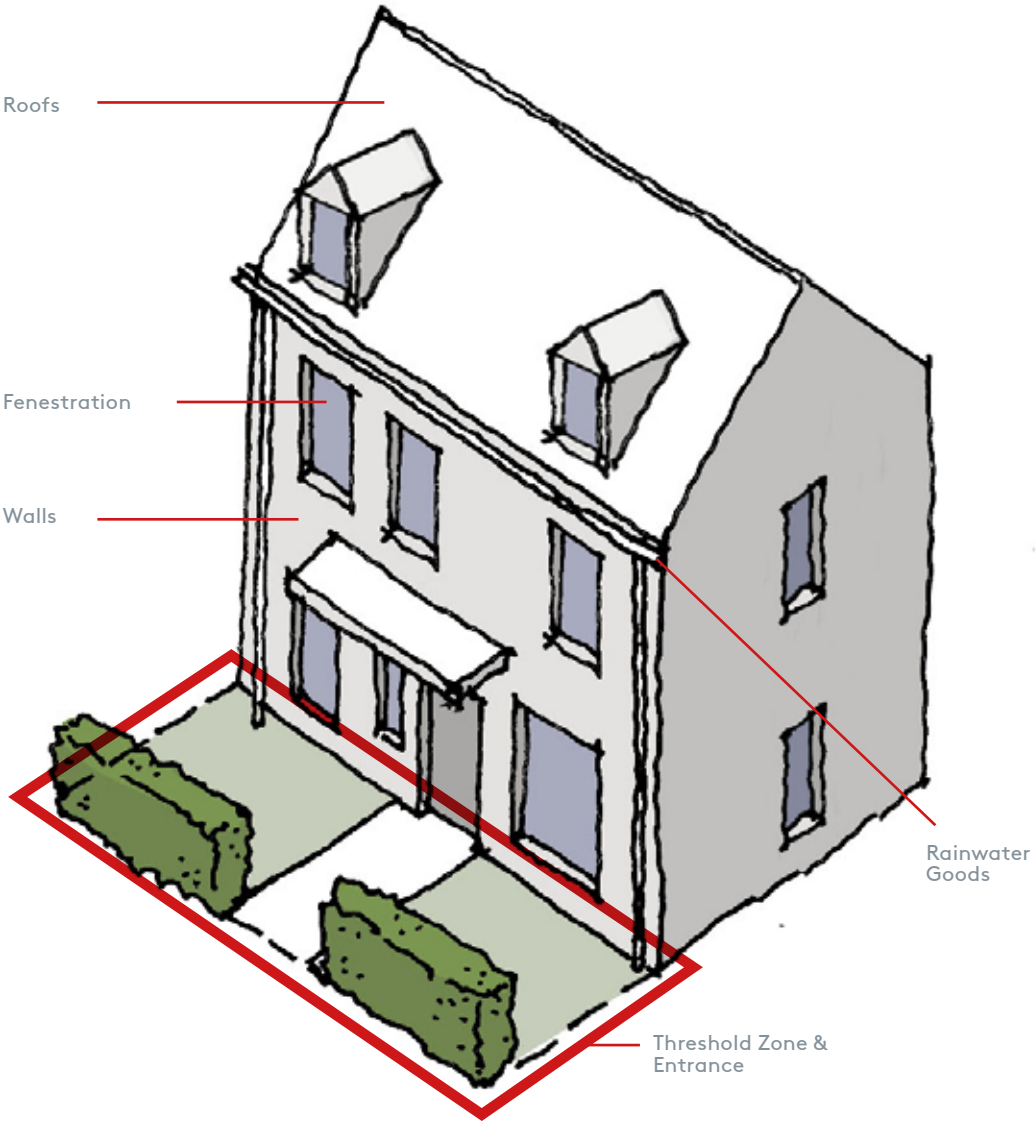

Fig 5.35: Sketch identifying the five key plot and building features

Threshold zone

Walls

Fenestration

Rainwater goods

Roofs

Threshold Zone & Entrance

Defined as the area between back edge of footpath/ street corridor and front elevation, threshold zones should generally accord with these principles:

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Front doors

- Recess front doors where possible, to emphasise the entrance and create depth within the elevation;
- Front doors should be of a high quality, in keeping with the character of the dwelling through the use of appropriate materials;
- uPVC doors will not be permitted on elevations which are apparent from the public realm.

Porches

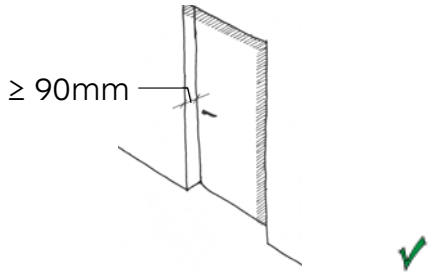
- Porches should be designed as integral to the overall composition of the elevation with sufficient depth to provide shelter;
- Pitched roof porches should match materials used on the roof of the dwelling, whilst flat roof porches will have a roof finish of lead, or be of proprietary manufacturer;
- Porches can be formed by a recessed entrance within the primary elevation;
- Poor quality GRP porches should be avoided.

Defensible space

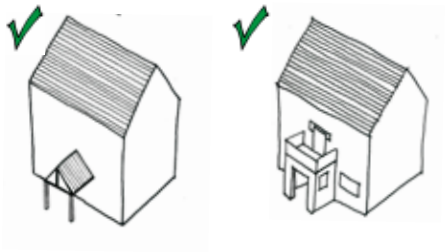
- Buildings with residential accommodation at ground floor level should incorporate a 'defensible space' between them and back-of-footpath enclosed by brick walling to match the primary building material, railings, low fencing or robust planting;
- Utility meter boxes where possible should be located on inner flank walls of porch structures / recessed porches, or otherwise concealed from view;
- Refuse storage for homes should follow the principles for refuse storage solutions set out in the National Model Design Guide.

On-plot paths

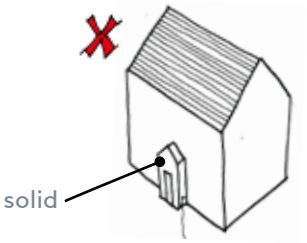
- On plot paths to be finished in block paving or similar - any deviation will require explanation in a justification statement.



All front doors and garage doors will be recessed a minimum of 90mm from the brick / finished face.



Entrances will be celebrated and designed as integral to the elevation. Porches will provide sufficient shelter.



Decorative, built porches and small scale porches that provide insufficient shelter will not be permitted.

Porch designed as integral to the elevation and helps celebrate the building entrance.

Concealed bin storage should be sited unobtrusively or integrated with the building.

5.11 PLOT AND BUILDING FEATURES

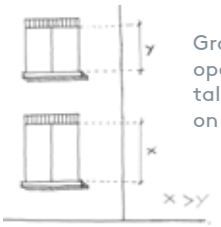
Fenestration

Fenestration and associated window features should generally accord with these principles:

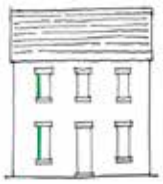
Windows:

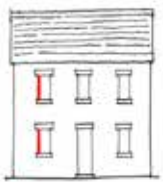
- Window openings should be generous through their size / proportions and have a vertical emphasis;
- A clear hierarchy of fenestration should be achieved whereby ground floor windows will be taller;
- All openings within external brick walls should be set back to display a reveal and give depth to the elevation;
- Colour of frame, quality and design of windows should be consistent on all elevations of a dwelling / apartment building;
- Fenestration should have a vertical proportion;
- Asymmetrically openable window configurations should be avoided;
- Ground level fenestration should be distinctly taller than fenestration on levels above;
- The size of glazed openings will be maximised and the number of mullions and transoms minimised.

Consistent windows across elevations



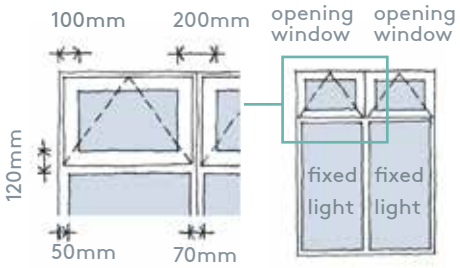
Ground Level openings will be taller than those on upper floors



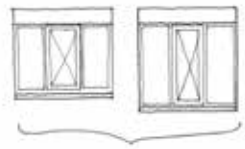


Ground Level openings will generally be taller than those on floors above.

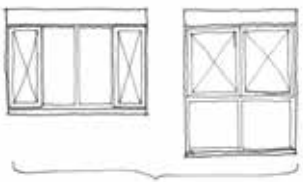
Window Composition



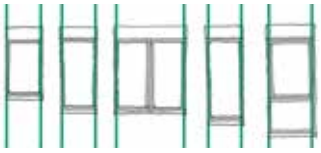
Maximum frame dimensions



Centrally openable

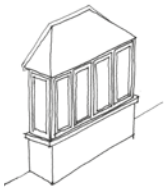


Symmetrically openable



Simple, window palette with vertical emphasis.

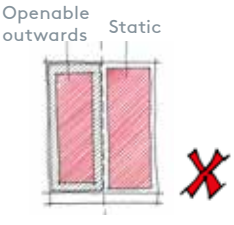
Simple, vertical fenestration



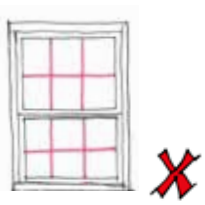
Repeated vertical windows make up composite elements.

Unacceptable Design Details:

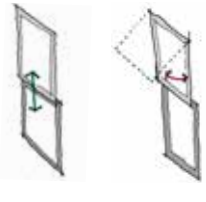
Inconsistent window treatment on different elevations



Asymmetrically openable window configurations



Decorative sub-division of window panes, or "Georgian bars" are not permitted



Top-hung sash windows are not permitted.

Dormer Windows:

- Dormer windows should be integral to the composition of the main facade in terms of design and positioning;
- Dormer windows should maintain overall vertical proportions, i.e. be taller than they are wide;
- The number and proximity of dormers which break the eaves line should be limited to avoid excessive rainwater goods on the building elevation;
- Poor quality GRP roofing should be avoided;
- Gabled dormers should use a consistent pitch and material to that of the main roof;
- Hipped dormers should be carefully detailed to avoid oversizing of ridge and hip tiles;
- Flat roof dormers should use standing seam lead, or proprietary roof manufacturer.

Bay Windows:

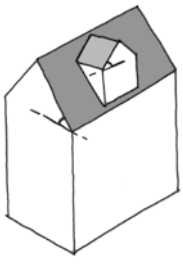
- Bay windows are appropriate if considered as part of the whole elevation;
- Poor quality GRP roofing to bay windows should be avoided;
- Roofing material will match the selected material of the main roof.
- Frame members and corner posts should be carefully considered to ensure they are neither too bulky nor too flimsy;
- If pitched, the roofing material of bay windows should match the selected material of the main roof;
- If flat, the roofing material of bay windows should be lead or proprietary roof manufacturer.

Balconies:

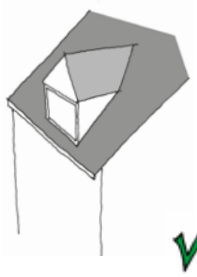
- Balconies should be integral to the composition of the main facade in terms of design, positioning and materiality.
- Balconies should be appropriately sized as usable outdoor space.
- External load bearing structures for the support of balconies are only permitted in the case of 2 storey dwellings. Their selection needs to demonstrate a clear design rationale so as to ensure that they complement the elevation's composition.

Bay Windows:
Bay windows designed as part of overall composition of elevation.

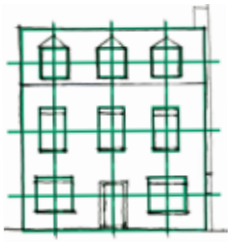
Dormer Windows:



Consistent pitches

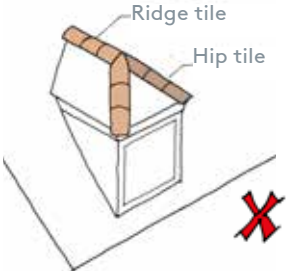


Dormers will be designed to avoid interruption of eaves.



Dormer windows need to complement, and align with, the fenestration of the facade.

Unacceptable Design Details:



Ridge and hip tiles that are disproportionately large are not acceptable

Balconies:

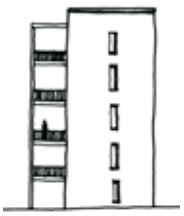
Balcony design will be integral to the composition of elevations

Cantilevered balconies for multi-storey buildings are acceptable.

Appropriately sized inset balconies are also acceptable.

Unacceptable Design Details:

External load bearing structures for the support of balconies of multi-storey buildings.



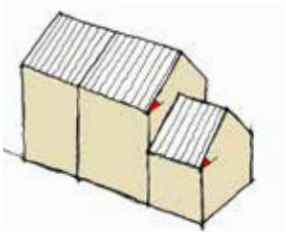
5.11 PLOT AND BUILDING FEATURES

Roofs, eaves and verges

The design of roofs and associated components should generally accord with these principles:

- Roof pitches should be between 35 and 52 degrees;
- The roof pitch should be of a consistent angle along a terrace or group of buildings;
- Wall and roof materials should be given primacy, avoiding the use of obtrusive boxed eaves;
- Barge boards should be shallow and match window frame colour;
- Parapet verge details are encouraged;
- Vents should be black and positioned away from the front elevation of a building where possible, to the side or rear of a building, or located within vent stacks;
- Pipes, vents and flues should be architecturally integrated and should align with adjacent building features;
- Green roofs are encouraged.

Roofs:



All dwellings in a terrace will have consistent roof pitch

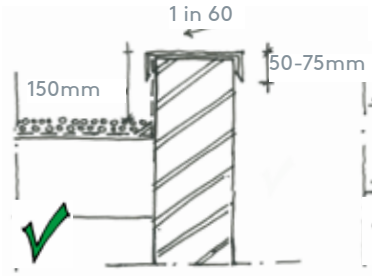
Eaves:

Eaves will be clipped / parged or use a shallow depth black fascia/barge board.

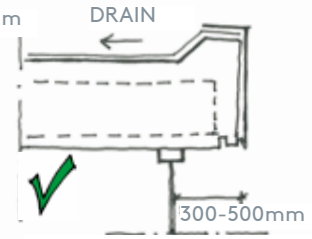
Clipped / parged eaves

Shallow, black fascia / barge board on eaves

Flat Roofs:



Flat roof concealed behind parapet



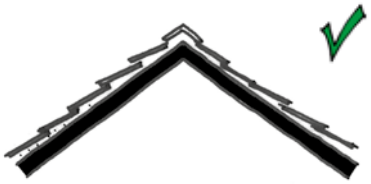
Overhanging flat roofs that are carefully detailed are acceptable

Verges:

Verges will be clipped / parged, parapet or use a shallow depth black fascia/barge board.

Clipped / parged verge

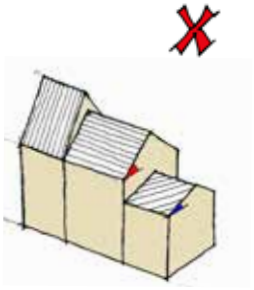
Parapet verge



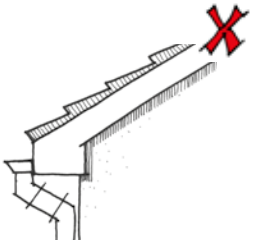
Shallow, black fascia / barge board on verge

Unacceptable Design Details:

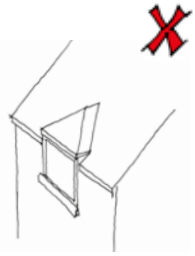
- Inconsistent roof pitch along a frontage and / or connected dwellings will not be permitted;
- There will be no mix of both hips and gables on any single building;
- Eaves will not be repeatedly interrupted by dormer windows creating facades cluttered with downpipes;
- Boxed eaves will not be permitted;
- White UPVC will not be permitted for roof and eaves details.



Inconsistent roof pitches along terrace



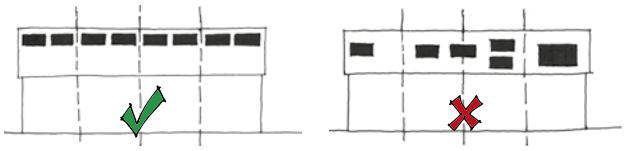
Boxed eaves are not permitted



The interruption of eaves by dormer windows should be minimised

Photovoltaics:

- The design and location of photovoltaic panels/tiles will be well thought out as part of the overall roof composition so that they are discreetly located and their visual impact is minimised. Innovative designs which integrate them into the building fabric will be encouraged.
- The provision of photovoltaics will be consistent along any terrace or group of buildings.



The installation of Photovoltaics must be designed into the elevation and be consistent along any terrace or group of buildings on the street.

Photovoltaic panels that are visually intrusive to the public realm will not be acceptable. In particular, 'stepped' configurations of photovoltaics will not be permitted.

Solar slates integrated into a tiled roof can be virtually indistinguishable when viewed from the street.

Walls

Building walls should accord with these principles:

- A maximum of two materials should be chosen for exterior walls of any given building, with a clear primary material expressed through proportion of material coverage;
- Primary wall materials, principally brick, should provide a richness and texture to elevations (see brick principles below);
- Tile hanging, weatherboarding and brick detailing should be used to complement and add richness and variety to the predominant red brick vernacular;
- Copings to parapet walls should be detailed to prevent staining of façades by water flow from the top of that parapet;
- Heavy materials at the base / ground floor should be used to emphasise the impression of a solid base.
- When using render, only one render colour on a single dwelling/apartment building.
- Where heat pump units are positioned external to a dwelling, measures must be taken to introduce suitable enclosure / screening and to minimise the system's visual impact. Simple louvred aluminium covers with a colour finish selected to complement the dwelling (e.g. window frame colour) will be an acceptable measure.

Brick:

- The specification of brick type and colours should give texture and subtle variation across building elevations;
- Red brick tones should be the primary facing material to buildings and will feature as a component of boundary treatments;
- Feature bricks such as a blue / black / grey brick could be used as an accent building material to contrast with the predominant red.
- Brick detailing should be simple and match the main brick colour.
- Integral swift bricks should be installed on property walls.

Good application of 'accent' coloured brick.

Well screened heat pump unit.

5.11 PLOT AND BUILDING FEATURES

Rainwater Goods

The use of rainwater goods should accord with these principles:

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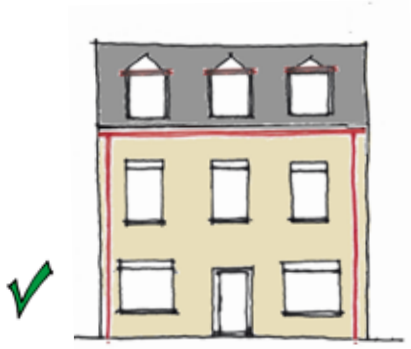
- Rainwater goods should not detract from the overall composition of the building elevation or street elevation;
- Rainwater goods including guttering and rainwater pipes will preferably be black in colour or a metal finish. White rainwater goods will not be permitted;
- Downpipes should be applied to the same elevation as the gutter to which they connect.

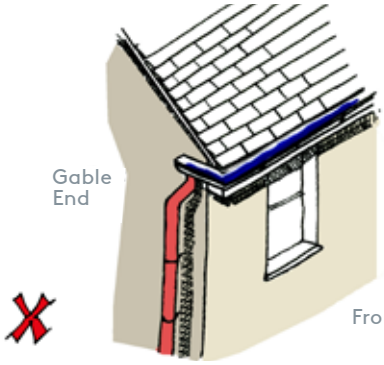


The visual impact of any rainwater goods must be minimised so as not to detract from the overall composition of the elevation.

Unacceptable Design Details:

Rainwater downpipes dominating the composition of the elevation due to ill consideration of dormer windows.

Rainwater downpipes diagonally crossing the building elevation.



The positioning of downpipes on gable ends connecting to gutters on front elevations will not be permitted.

Downpipes should be carefully positioned to minimise visual clutter, avoiding unsightly junctions.

Rainwater downpipes dominate the composition of the elevation due to poorly considered placement of dormer window.

Robust planting to define defensible space.

Lack of defensible space between private and public realms.

Bay windows should be designed as an integral part of the elevation.

Poorly proportioned windows with inadequate design.

Positioning of rainwater goods carefully considered to minimise visual impact.

Poor quality brick with no variation or texture creating bland facades.

All terraces should have a consistent roof pitch.

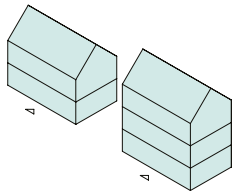
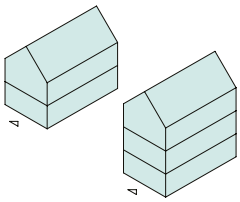
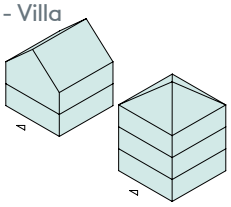
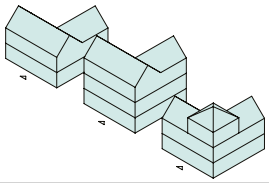
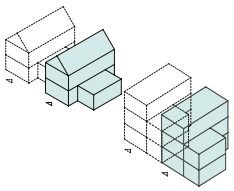
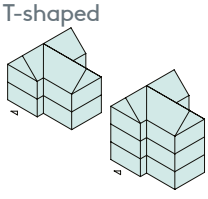
Inconsistent roof pitches along terraces should be avoided.

5.12 DWELLING TYPOLOGIES LIBRARY

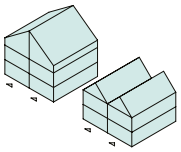
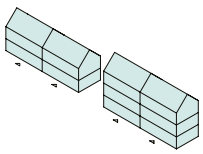
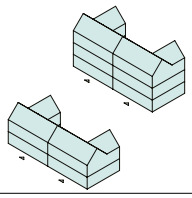
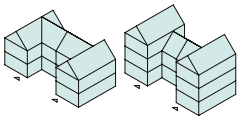
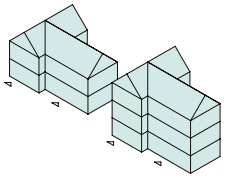
A library of appropriate dwelling typologies for residential development are described here for use within the parcels.
The Frontage Character Area pages in section 5.7 set out the appropriate dwelling types for the different frontage areas.

Section 5.9 also describes which typologies are more suitable for each inner parcel character area.
In addition to the described dwelling typologies, innovative typologies can be submitted for approval.

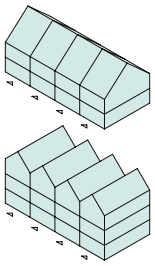
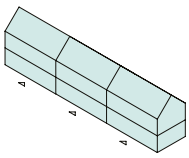
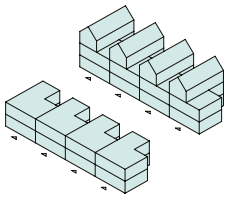
DETACHED DWELLING TYPOLOGIES

TYPOLOGY	DESCRIPTION
D1 - Wide frontage 	• The principal frontage width is greater than the depth of the primary building form. • The principal frontage is more than 8m wide. • The ridge line is parallel to the principal frontage.
D2 - Narrow frontage 	• The principal frontage width is less than the depth of the primary building form. • The principal frontage is less than 8m wide • The ridge line is perpendicular to the principal frontage.
D3 - Villa 	• The principal frontage width is between 90-110% of the depth of the dwelling. • The principal frontage is more than 8m.
D4 - L-shaped/corner house 	• The dwelling has two principal frontages at 90 degrees to one another. • Both principal frontages should face the public realm they abut are more than 8m wide.
D5 - Linked detached 	• The dwelling comprises a primary form and a secondary linking form. • The volume of the secondary building form is less than 60% of the volume of the primary built form. • When the secondary building form includes a garage, the frontage of the dwelling is more than 7m wide.
D6 - T-shaped 	• The dwelling has gable end on two principal frontages at 90 degrees to one another.

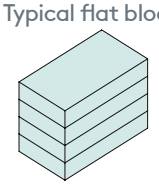
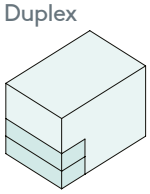
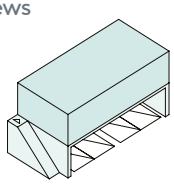
SEMI - DETACHED DWELLING TYPOLOGIES

TYPOLOGY	DESCRIPTION
SD1 - Narrow frontage 	• The principal frontage widths are less than the depth of the primary building forms. • The principal frontages are less than 8m wide. • The ridge line is perpendicular to the principle frontages and forms a combined pitched roof over both dwellings.
SD2 - Wide frontage 	• The principal frontage width is greater than the depth of the primary building forms. • The principal frontages are more than 8m wide. • The ridge lines are parallel to the principal frontage.
SD3 - L-shaped 	• The dwellings have two principal frontages at 90 degrees to one another. • Both principal frontages are more than 8m wide. • Two dwellings are attached to form a U-shape.
SD4 - Inverted L-shape 	• The dwellings have two principal frontages at 90 degrees to one another. • Two dwellings are attached to form an H-shape.
SD6 - T-shaped 	• The T-shaped typology consists of a wide frontage (D1) and a narrow frontage (D2) adjoined. • The wide frontage unit's principal frontage is more than 8m wide. • The ridge lines are perpendicular to each other. • The dwellings are set perpendicular to each other.

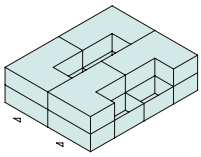
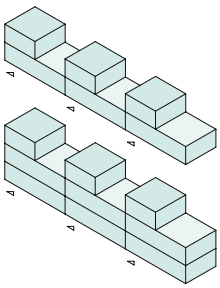
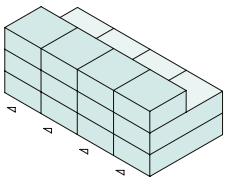
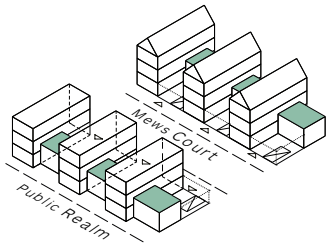
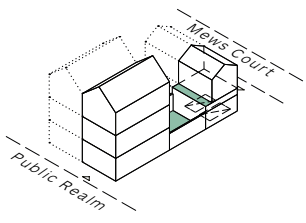
TERRACED DWELLING TYPOLOGIES

TYPOLOGY	DESCRIPTION
T1 - Narrow frontage (a) Ridgeline parallel to street (b) Gable-fronted 	• The principal frontage widths are less than the depth of the primary building forms. • The principal frontages are less than 8m wide. • Ginnels used to improve access to bins and bikes stored within rear gardens.
T2 - Wide frontage 	• The principal frontage widths are greater than the depth of the primary building forms. • The principal frontages are more than 8m wide. • The ridge lines are parallel to the principal frontages and are adjoining. • Ginnels used to improve access to bins and bikes stored within rear gardens.
T3 - Stepped / L-shaped 	• The dwelling comprises a primary form and a secondary form. • The volume of the secondary building form is less than 60% of the mass of the primary built form. • When the secondary building form includes a garage, the frontage of the dwelling is more than 7m wide. • Ginnels used to improve access to bins and bikes stored within rear gardens.

FLATS DWELLING TYPOLOGIES

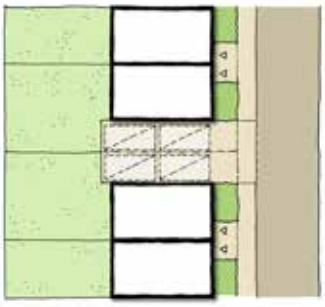
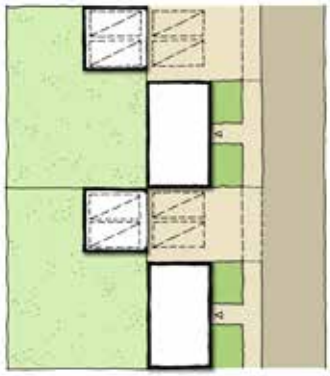
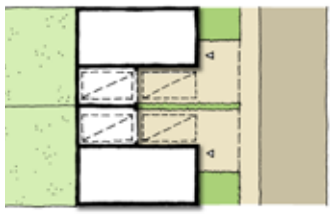
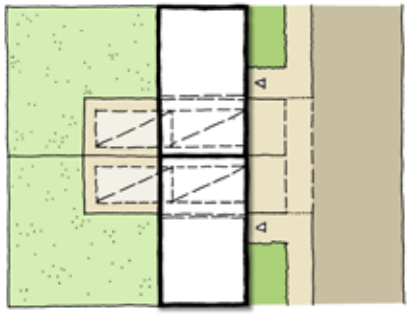
TYPOLOGY	DESCRIPTION
F1 - Typical flat block 	• The block is at least three storeys in height with a depth of no more than 14m • The internal layout does not include single-aspect north facing flats • L- shaped and U-shaped flat blocks are also acceptable
F2 - Duplex 	• A dwelling within a flat block that is arranged over two storeys • A private entrance may be provided directly from the street at ground level • The duplex flat is not single aspect north facing
F3 - Coach house / mews 	• Accommodation is provided above garages within a mews or parking court arrangement • The flat provides natural surveillance to the mews or court • The flat is no more than one storey and may be paired

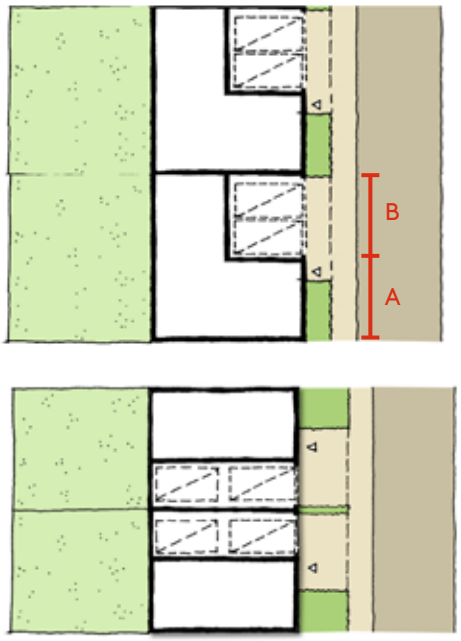
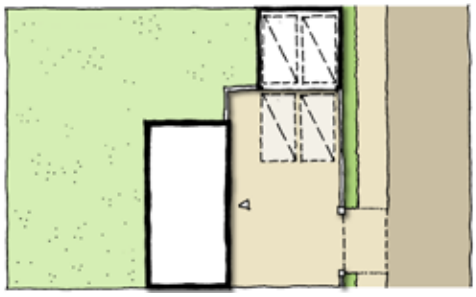
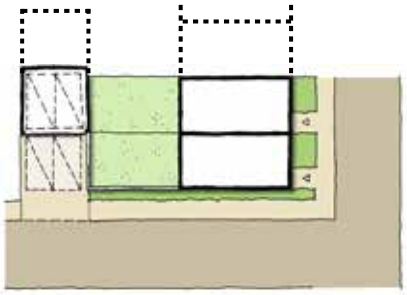
URBAN DWELLING TYPOLOGIES

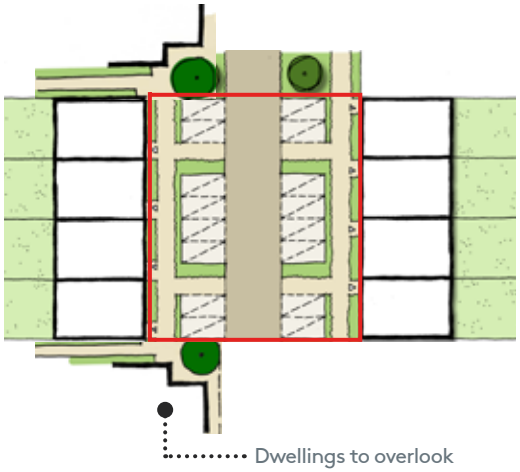
TYPOLOGY	DESCRIPTION
U1 - Courtyard 	• The principal frontage is more than 7m wide. • Courtyard is created using L-shaped building footprints, connected in back to back terraces. • Courtyards are more than 4x3m in size.
U2 - Side terrace 	• The principal frontage widths are greater than the depth of the primary building forms. • The principal frontages are more than 8m wide. • The primary amenity space for the dwelling is provided as a large terrace at first or second floor level.
U3 - Rear terrace 	• The principal frontage widths are less than the depth of the primary building forms. • The principal frontages are less than 8m wide. • The primary amenity space for the dwelling is provided as a large terrace at first or second floor level.
U4 - Dual aspect courtyard 	• The dwelling comprises a primary form and a secondary form. • The primary form must be 3 storeys. • The secondary form may be omitted provided that dwellings are linked by a solid wall. • The primary amenity space for the dwelling is provided as a large terrace and / or courtyard spaces or side gardens. • The dwelling must be dual aspect to provide natural surveillance to both the mews court and street, with the primary entrance from the mews court. • Parking provided at surface level in mews court will be subject to the parking typology rules set out in Section 5.13 and the detailed principles for parking court design in Section 5.13.1. • Additional on-plot parking is permitted to ensure mews court is not a car dominated space.
U5 - Townhouse with annexe 	• The dwelling comprises a primary and secondary building. • The primary building is the main dwelling and addresses the public realm. • The primary building must be 3 storeys. • The secondary building is located in the rear and addresses the mews courtyard. • The secondary building is within the same ownership as the main dwelling. • Parking to be provided at ground level.

5.13 PARKING TYPOLOGIES LIBRARY

Acceptable parking solutions are illustrated below. Reserved Matters Applications for KP4 must demonstrate which parking solutions are used within the design, as appropriate to the relevant descriptions as set out in the following tables. Details of parking standards and dimensions are provided in chapter 4.

TYPOLOGY	DESCRIPTION / NOTES (M)
P1 - On-plot between dwellings 	
Alternative layout options:  	• Parking spaces must be set behind the front building line. • Spaces will be designed to not allow for tandem parking projecting beyond the building line. • Windows to be provided on flank elevations from habitable rooms overlooking parking/driveways. • A maximum of two tandem spaces to be provided between dwellings. • where two garages are adjoined, they should be along the same building line • sufficient space should be left between dwelling and garage to allow access to rear amenity access.
P2 - Front access drive through 	• An openable screen or gate with visual permeability must be used to access parking spaces to ensure that gardens are not open to the street. • Solid garage doors must not be used for drive through parking spaces (except for a flat over garage where this will be permitted).

TYPOLOGY	DESCRIPTION / NOTES
P3 - Integral garage 	• Spaces will be designed to not allow for tandem parking projecting forward of the building line • There should be clear delineation between driveways for adjacent properties. • The dwelling frontage width (A) must be equal or greater than the total parking space width to prevent tandem parking from projecting forward and beyond the building line (B).
P4 - Forecourt 	• Applies to large dwellings only. • The front boundary will be walled (this must be complied with, regardless of the permitted boundary typologies in each frontage character).
P5 - On-plot corner 	• A maximum of four spaces (or 2 double garages). • Enclosure will be provided through the use of brick walls enclosing parking bays.
P6 - Mews 	• At least one side of the mews should have housing or FOGs to ensure natural surveillance over the parking area. • For continuous mews, proposals must demonstrate good levels of activity on the street to ensure sufficient ground floor natural surveillance. • Any gates should be set back 5.5m from back of footway and open into the mews.

TYPOLOGY	DESCRIPTION / NOTES
P7 - Off street frontage  Dwellings to overlook perpendicular parking. Blank flank elevations facing the parking will not be permitted.	• To provide no more than 8 parking spaces on any one side of the street. • A maximum of four spaces in a row separated by landscape. • A minimum landscape break of 1.5m wide to accommodate tree or specimen shrub planting. • Particular consideration needs to be given towards the soft and hard landscaping to distinguish this space as a courtyard environment. • Tarmac should be avoided in surfacing frontage car parking bays. Surfacing similar to the footpath and carriageway of the adopted highway can be used to support a wider cohesive streetscene • Hedging and landscape will be used to assist in defining the spaces. • The layout of the parking to be formed to create a rhythm to the landscape. • Shrubs or trees to be positioned to minimise car door damage to plant stems. • Small sized tree species to be planted no closer than 5m to the dwelling. • Medium sized tree species to be planted no closer than 7m to the dwelling. • Hard landscape treatment to provide a clear space to readily manoeuvre around the parked cars. • A footpath will be provided between the parking bays and the privacy strip / front garden of properties. • Road width to be 6m wide to allow cars to manoeuvre into and out of a space. Swept paths will be required to demonstrate this.
P8 - On street 	• A maximum of 2 spaces before landscaping occurs unless located within the mixed use area. • Medium sized tree species to be planted no closer than 7m to the dwelling. • Designed and located to prevent unauthorised parking.
P9 - Detached car barns/ structures 	• No more than eight spaces in a single structure • Frame structures are also permitted • Natural surveillance required from proximate dwellings • Car barns/ structures will only be acceptable where they are sensitively designed so not to appear prominent, intrusive and incongruous.
P10 - Rear parking courts  Rear FOG/coach house Alternative layouts for apartments:  	• Courts to serve no more than 6 dwellings / 12 parking spaces. For apartment blocks this may be increased, but courts must to be sensitively designed with a strong framework of landscape planting. • Tandem parking within parking courts should be discouraged unless adequate manoeuvring space can be demonstrated. • No more than 4 parking spaces before landscaping occurs. • Enclosure will be provided to define the access, through the use of walls. • Appropriate landscaping must be provided in compliance with the detailed principles for parking court design set out in the next page. • FOGs / coach houses to accommodate on plot storage of bins and bikes for the host dwelling. • FOGs / coach houses to not include garage doors to ensure parking space will be retained in perpetuity. • Court will be designed as a whole to create a coherent space. • All rear parking courtyards must adhere to the detailed principles for parking court design set out in the next page. • Surface treatment to be discussed with LPA prior to submission of reserved matters application. • Access width of 5.5metres needs to be provided.

5.13.1 Principles for Parking Court Design

Rear parking courtyards are generally discouraged on the basis of the widespread preference of residents to park close to their front door. However, the use of parking courts is required when vehicular access to the front of dwellings cannot be achieved. Rear parking courtyards will be considered part of the public realm and must therefore be designed as good quality public spaces, with the following design features:

M

Access and visibility

1. Clear sightlines must be provided into and within the courtyard. Hidden corners or recessed parking bays must be avoided. The number of access points should be afforded careful consideration, balancing the need for good pedestrian connectivity through the site with community safety.
2. At least one property is to be located within the courtyard to offer opportunities for natural surveillance
3. Direct access from allocated parking spaces to the front door of their associated home must be provided (one exception below). Where ginnels between plots are provided, attention must be given to preventing crime and antisocial behaviour.
4. If direct access to the front door is not possible for all dwellings, then rear access into those homes must be to the kitchen, hallway or utility room.
5. Where pedestrian footpaths are provided that connect courtyard parking spaces with the front door of people's homes these must be afforded good, clear sightlines and be well lit.
6. Low level bollard or street lighting must be provided within the parking court.

Landscaping

7. Appropriate and robust landscaping to help soften the environment, such as trees and hedgerows will be required. Planting must be carefully placed in a way that does not restrict sightlines. Landscaping strips should be a minimum of 1.5m.
8. A medium or large tree species must be located in view from the street (and planted no closer than 7m for a medium tree or 10m for a large tree to the nearest building respectively).

Boundaries and materials

9. All boundaries facing the courtyard to be 1.5m high brick walls with an additional 0.3m hit and miss brick wall above and detail courses as appropriate. Where walls change direction, they should be either curved or angled. Where walls are angled, bricks must be cut and bonded.
10. Block surfacing, with parking bays in either: the same block, or contrasting block. Tarmac may be accepted in exceptional circumstances where this would complement the design of adjoining buildings and result in an exceptional improvement in the design and visual qualities of the scheme. Individual parking bays must be discreetly delineated with blocks and individual bays discreetly numbered with a metal plate affixed to either the kerb face, wall or bay surface. Thermoplastic markings (white lining) will not be permitted to either number or delineate individual bays.

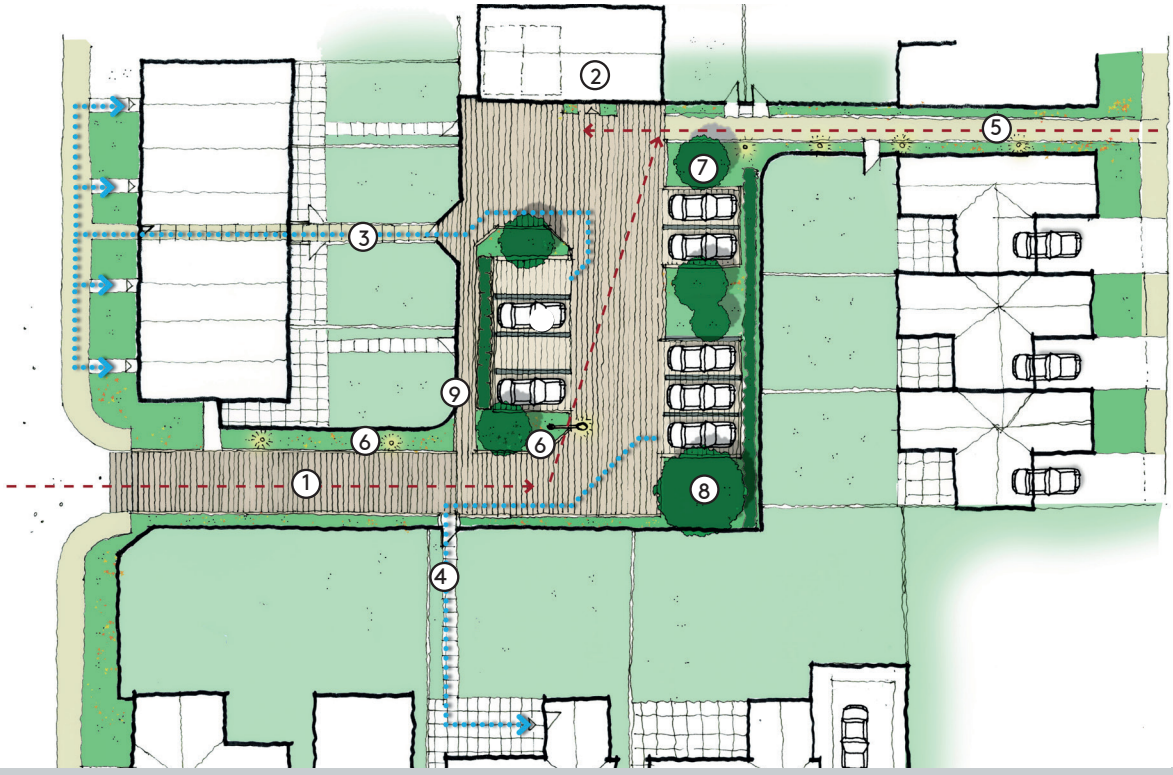


Fig 5.36: Illustration of detailed principles for parking court design

5.14 BOUNDARY TYPOLOGIES LIBRARY

The table on the following page sets out the boundary typologies for use within Houlton Key Phase 4.

The Frontage Character pages in Section 5.7 set out the appropriate boundary typologies permitted along labelled edges of residential development on the Regulatory Plan. Reserved Matters Applications will adhere to the principles set out in the Frontage Characters and to the descriptions of all typologies selected. Boundary typologies will not be used if they are not permitted within the relevant frontage character.

Precedents - Suitable design solutions

Boundary Type B1 - No boundary

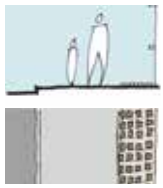
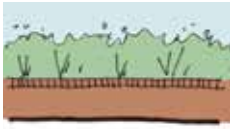
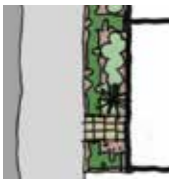
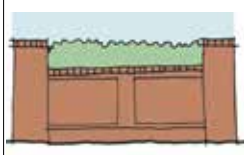
Boundary Type B2 - Urban Style Railing

Boundary Type B4 - Railing and hedge

Boundary Type B5 - Low wall and ornamental hedge

Boundary Type B6 - Ornamental hedge

Boundary Type B7 - Planted zone

TYPOLOGIES	ILLUSTRATION	DESCRIPTION	NOTES
B1. No boundary	Plan: 	• Set back is 1m or less (minimum 800mm to be maintained) • Hard surface finish preferable for urban frontages/ mews streets • Demarcation material / surface finish to delineate the boundary between adoptable highway and private areas/ defensible space.	
B2. Urban-style railing		• Height – 1.2m max • Set back minimum 1.5m • Black / grey metal, painted • Soft landscape to allow for shrubs planting • Contemporary and in character with the street scene • Bow top railings are not acceptable	Boundaries between front gardens of adjacent dwellings to be created through the same design of urban style railing or ornamental hedge
B3. Railing on low wall		• Height – 1.5m max • Set back minimum 1.5m • Up to 500mm high brick wall, 215mm thick. Brick wall with brick piers and coping to match dwelling. • Powder coated black or grey railings • Privacy zone – hard or soft landscape finish to differentiate ownership	Boundaries between front gardens of adjacent dwellings to be created through the same low height brick wall with the same railing OR ornamental hedge
B4. Railing & hedge		• Height – 1.2m max • Set back minimum 1.5m • Black metal painted (or grey) • Clipped hedge of continuous species • Gates to match railings • Black metal painted (or grey) estate rail or vertical rail design	Boundaries between front gardens of adjacent dwellings to be created through same railing or ornamental hedge
B5. Low wall & ornamental hedge		• Set back minimum 1.5m • 600mm brick wall with brick coping, clay tiles creasing, bricks to match dwelling • Hedge to grow not more than 900mm high	Boundaries between front gardens of adjacent dwellings to be created through the same low wall or ornamental hedge
B6. Ornamental hedge	 1.2m high	• Height – 0.9 / 1.2m max • Set back minimum 2m • Post and wire fence integral to the hedge while it establishes	Boundaries between front gardens of adjacent dwellings to be created through the same ornamental hedge
B7. Planted zone	Plan: 	• Set back is 1.5m or less (minimum 800mm to be maintained) • Height – maximum 600mm • Low clipped hedge with shrub planting • Planted area should be finished with 450mm depth of topsoil to allow for low evergreen shrubs • Grass or gravel or loose materials as surface cover are not acceptable	Boundaries between front gardens of adjacent dwellings to be created through same railing OR ornamental hedge
B8. Wall		• 1.1m high, with upwardly projecting piers • 215mm thick brick wall to match the house wall • Brick capping on clay tile creasing or cast stone coping. • Gates to be steel vertical bars painted black. • Should be placed to the back of footpath alongside the public highway boundary. • Not suitable typology for front boundaries onto pocket parks and incidental green space.	Boundaries between front gardens of adjacent dwellings to be created through the same design of urban style railing or ornamental hedge
B9. Timber knee rail		• Height – 450mm max • Set back is 1m from edge of road • Timber fencing	To be used exclusively along Green Corridor

5.14 BOUNDARY AND TYPOLOGIES LIBRARY

Side Boundaries

M

The following design criteria will be adhered to:

- Brick walls will be used along garden boundaries which flank a street, as a continuation of the built form.
- The wall must be between 1.8-2.1m high.
- An additional soft verge of 1.5m will be provided in addition to a wall along garden boundaries which flank a footpath/cycleway. This may reduce to 1.0m for footpaths along minor streets and lanes.
- Timber fencing or walls will be used for side boundaries between gardens.

Rear Boundaries

The following design criteria will be adhered to:

- Brick walls will be used along rear boundaries which back onto courtyard parking areas or public realm.
- The wall will be between 1.8-2.1m high with a semi-permeable section from 1.5m upwards to create a level of surveillance to the public space.
- Pedestrian access to parking courts via rear boundaries will be provided via gates if the dwelling is allocated parking in this area.
- Timber fencing or walls will only be used for rear boundaries between gardens.

- Appropriate boundary treatments and retaining features must be considered where there are level differences.

Topography and Levels

Topographical and level changes across the site should be carefully considered in the design of the proposed development. The development should take advantage of the existing topography and manage changes in level in a way that does not compromise the qualities of the street. It should specifically work with the contours of the land rather than against them and explore how built form and detailed housing design can creatively respond to the topographical character.

M

The following mandatory principles will be adhered to:

- Finished floor levels and the roofscape should respond to level changes and step down any slopes across the site.
- The use of large monolithic single level slabs that ignore the topography and roof ridge lines with a continuous height should be avoided.
- The use of stepped levels, boundary walls and retaining walls to the front of dwellings for parking and landscaping should be kept to a minimum with a preference rather being given to gradually grading the levels.
- Finished levels across the site should minimise steps and level changes to make them as easy as possible for pushchairs and wheelchairs.
- Retaining walls shall be limited to use within rear gardens rather than in the public streetscene.
- Where retaining walls are utilised, rear gardens should be terraced to step down slopes to avoid high retaining walls with fences above (i.e. generally a retaining wall to a maximum of 1m high with 2m high fence above).

Precedents - Suitable design solutions

Side fence between gardens

Side Boundary with planted zone

5.15 SAFETY & SECURITY PRINCIPLES

Community safety is a key component of any successful place and an important design aim has been to establish the framework for a new neighbourhood that will feel safe and secure at all times, encouraging full use of its streets and spaces by all sections of the community.

In order to achieve this, the document 'Safer Places - The Planning System and Crime Prevention' sets out seven principles to help design out crime.
The seven principles below will be adhered to:

PRINCIPLE ONE ACCESS & MOVEMENT:
Places must be designed with well defined routes, spaces and entrances that provide for convenient movement without compromising security;

PRINCIPLE TWO STRUCTURE:
Places must be structured so that different uses do not cause conflict;

PRINCIPLE THREE SURVEILLANCE:
All publicly accessible spaces must be overlooked;

PRINCIPLE FOUR OWNERSHIP:
Places must promote a sense of ownership, respect, territorial responsibility and community;

PRINCIPLE FIVE PHYSICAL PROTECTION:
Places must include necessary, well-designed security features;

PRINCIPLE SIX ACTIVITY:
Places must be designed so that the level of human activity is appropriate to the location and creates a reduced risk of crime and a sense of safety at all times;

PRINCIPLE SEVEN MANAGEMENT & MAINTENANCE:
Places must be designed with management and maintenance in mind, to discourage crime.


Places with well defined routes


Places that creates a sense of safety at all times, with overlooked publicly accessible space


Places that include well-designed security features

5.16 REFUSE AND RECYCLING STRATEGY

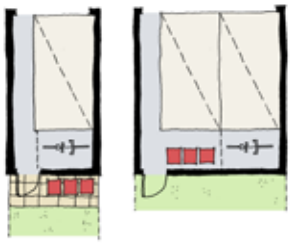
Mandatory Principles

The proposed development will comply with following mandatory residential bin storage principles:

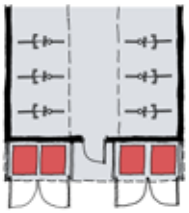
- In line with the Building Regulations municipal waste collection bins are to be located within 30 metres of a home's entrance and refuse bins should be within 25 metres of a waste collection point.
- Accordingly, provision for refuse collection must meet one of the residential collection options illustrated in Figure 5.44.
- RBC operate their own waste collection fleet. Under this strategy each property is provided with 3 wheeled bins. Dwellings are to be provided with suitable bin storage.
- Apartment blocks are to be provided with communal bin stores, which are to be designed within the apartment block or grounds away from public realm and primary entrance.
- Appropriate bin storage must be provided to ensure bins are not dominant on the street scene.
- Enclosure as well as screening should be considered in the design of the bin storage.

The storage and collection strategy will vary between the different types of dwelling. This is illustrated in the following diagrams. Suggestions as to how bins can be incorporated into car barns are also illustrated opposite.

1. Car barns can provide bin storage areas at the rear of the shelter, to be wheeled to the collection point on specific days.



2. Garages for dwellings can also provide a storage area for bins, or bins can be stored against a wall on a paved area within the private amenity space, however this should be not be placed fronting onto the main entrance area /drive.



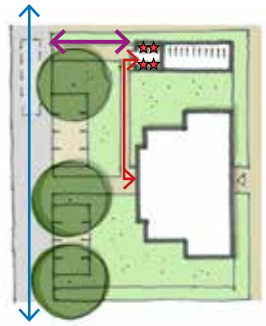
3. Apartment blocks are provided with communal bin stores. This can be designed as part of the bike store within the grounds of the apartment block or separate bin stores integrated with the building. This must not face the public realm or main pedestrian entrance to the block. Open bin storage areas should never be placed along the main approach to the parking court of the block.

Fig 5.37: Illustrations and narrative for storage in car barns, garages and apartment block with associated text see KP2, p130 or KP3, p140

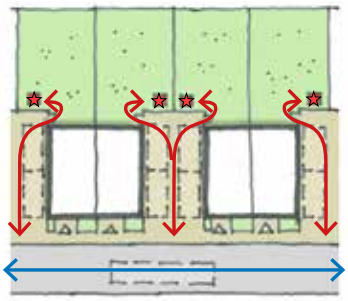
Residential Refuse Collection Options:

KEY
- Waste bins location
- Waste bin communal collection point
- Occupier route to collection point
- Refuse collectors walking route
- Refuse collection vehicle route

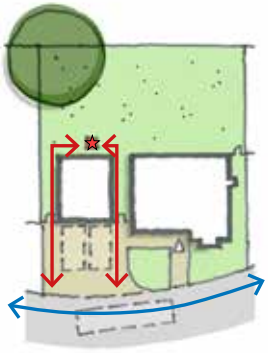
Apartments:



Semi-detached dwellings:

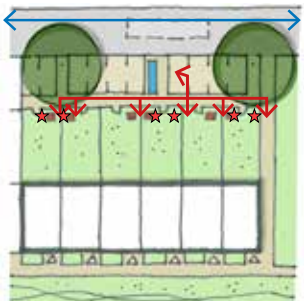


Detached dwellings:

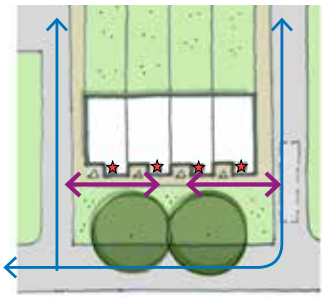


Terraced example 1:

Terraced example 2:



Terraced example 3:



Terraced example 4:

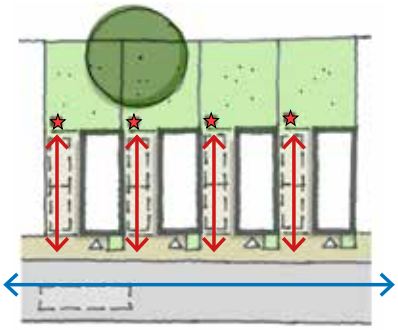


Fig 5.38: Residential refuse collection options

Communal bin/bike stores for apartment blocks must be sited unobtrusively and be well landscaped.

Dominance of bins cluttering street scene or lack of enclosure is not acceptable

5.17 PRIVATE AMENITY SPACE

Mandatory Principles

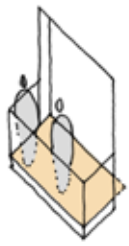
Private amenity space will be provided appropriate to the dwelling it serves. As a minimum, dwellings will be expected to have direct access to private amenity space according to their size and likely number of occupants, as opposite:

- Detached or semi-detached family homes with three or more bedrooms must have gardens capable of comfortably accommodating outdoor seating for the family, space for children's play, planting beds, space for drying clothes, and room to unobtrusively accommodate a shed or greenhouse.
- Where area for covered bin and bike storage is to be accommodated within private garden areas, it must be in addition to the minimum areas quoted below and must be directly accessible from the street serving the property.
- Compact two and three bedroom houses should have sufficient ground-level private amenity space to accommodate activities of a couple or young family.
- Courtyards and upper-level terraces will be considered to contribute towards the requirements of private amenity space.
- If apartments are provided without sufficient amenity space directly accessible from the dwelling, then apartments communal gardens, private to the block, may be considered to make up the shortfall.
- Where there is rear access to multiple rear gardens this access needs to be gated at the front of the building line and with a self-closing spring, and a snap shut lock, that needs a key to release.
- Boundaries between gardens should be 1.8m high close boarded fencing, but where gardens back onto parking courts or open space, 2m high walls – or 1.8m high walls topped with 0.2m trellis – should be used.
- Garden fences between properties should be hedgehog friendly. Hedgehog friendly fencing for rear garden fences will include for 13cm squares gaps at the base of fencing. One such gap in each boundary of the garden will be sufficient.

The adjacent diagrams presents guidelines for minimum standards for amenity space for different types and sizes of residential homes. A relaxation in any of these minimum standards will only be considered in those circumstances where it is clearly demonstrated that this aids the generation of a well-designed layout which respects the residential amenities of the occupiers of the proposed dwellings having regard to acceptable levels of privacy, daylight/sunlight and any potential overbearing impact.

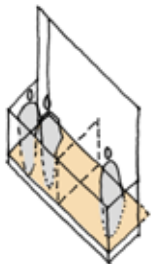
Flats

1 BED / 2 PERSON



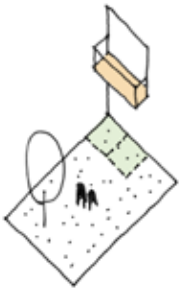
5 sqm — Private Balcony

2 BED / 3 PERSON



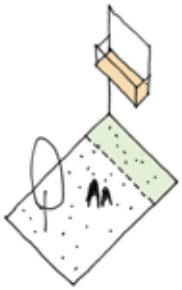
6 sqm — Combined total area of Private Balconies serving dwelling

2 BED / 4 PERSON



8 sqm — 6sqm of private balconies & 2sqm communal space

3 BED / 5 PERSON

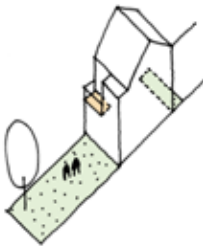


10 sqm — 6sqm of private balconies & 4sqm communal space

Note: balconies should be a minimum of 1.5m deep to accommodate a table and chairs.

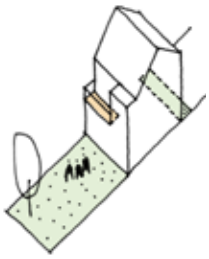
Houses

2 BED/ 3/4 PERSON



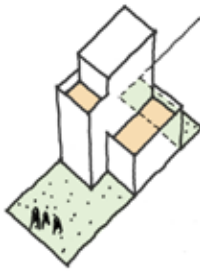
50 sqm — front/back/side gardens & terraces

3 BED/ 4/5 PERSON



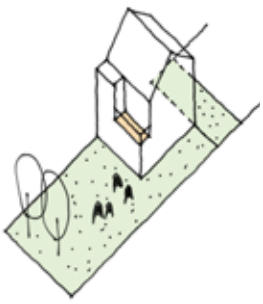
60 sqm — front/back/side gardens & terraces

4 BED/ 6/7 PERSON



85 sqm — front/back/side gardens & terraces

5 BED/ 7/8 PERSON



100 sqm — front/back/side gardens & terraces

Note: the quantity of private amenity space listed for houses may comprise of private amenity space provided in: back gardens, front gardens, roof terraces / roof gardens and balconies. It is anticipated that higher density housing will generate smaller back gardens but will meet the minimum standards utilising a range of the amenity space typologies listed.

5.18 UTILITY SUPPLIES

The proposed development (KP4) will be supplied with utility infrastructure (electricity, gas, potable water and telecommunications) connected to the incumbent utility provider's networks and distributed below ground across the proposed development phasing parcels.

Mandatory Principles for:

ELECTRICITY SUBSTATIONS

- 5 Substations to serve KP4.
- Locations identified in the adjacent diagram
- Each substation will require a 4m x 4m footprint.
- Substations will be designed in accordance with the ENA Engineering Recommendation G81 "Framework for Design and Planning, Materials Specification and Installation and Record for Low Voltage Housing Development Installations and Associated, New, HV/LV Distribution Substations" – Part 2 Materials Specification.
- Appearance: materials to match those of neighbouring built form, notably choice of bricks and roofing material to be same specification as adjacent buildings.

GAS

- To be served from the gas PRI within the wildlife corridor close to the CPS crossroad junction.

TELECOMMUNICATIONS (BT)

- The telecommunications network will be designed in accordance with the relevant utilities details prepared to support reserved matters applications.

POTABLE WATER

- Severn Trent Water (STW) are installing the potable water from Rugby along route agreed with Houlton project team.

Fig 5.39: Utility Supplies Key plan

- Existing sub station location
- Indicative proposed sub station location
- Existing gas PRI location

FOUL WATER

- Will be designed in accordance with the site wide strategy as agreed with STW.

UTILITIES WITHIN HIGHWAYS (ADOPTABLE) LAYOUTS

Predominantly the new infrastructure will be installed within the proposed highway (adoptable) layouts:

- Utilities under footways, drainage under roads and in accordance with National Joint Utilities Group (NJUG) guidelines.
- Figure 5.11 (see right) illustrates the NJUG recommended minimum depths of cover to the crown of the apparatus within a 2 metre wide footway.
- Where the utilities are installed outside of the adopted highways (e.g. green spaces) then wayleaves and easement to allow for future access will be agreed with the relevant utility provider.

Note: The same positioning should apply in the carriageway/ service strip (if safe and practical to do so) where a development has no footway(s) available for services and/or the boundary of the property is on the carriageway.

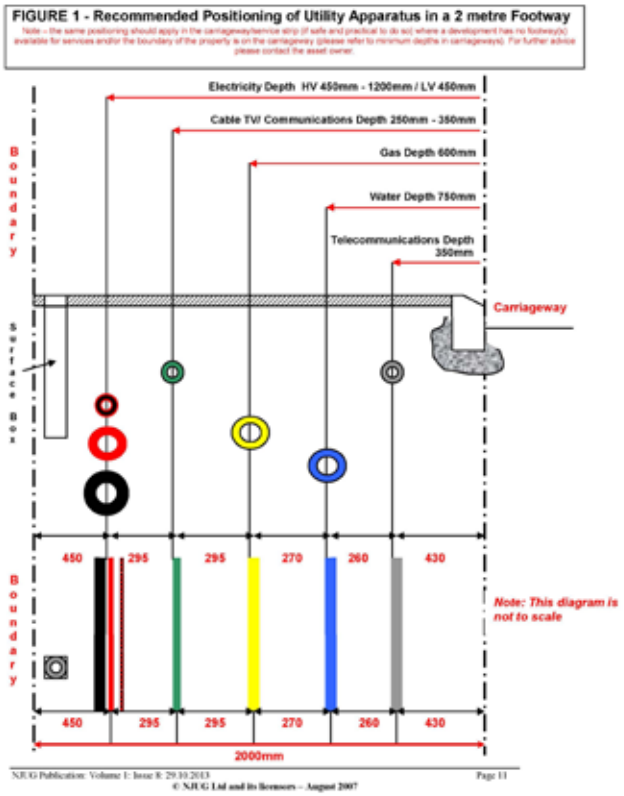


Figure 5.40: NJUG diagram

5.19 SUSTAINABLE BUILDING DESIGN

This section of the guide has been split into six categories to ensure a holistic approach to sustainable building design is achieved:

1. Solar orientation and building form
2. Energy
3. Water
4. Waste
5. Overheating
6. Materials

In order to ensure sustainable building design is achieved the following design specification targets have been set for housebuilders to follow.

For each target, where appropriate, tiers of performance are available to offer a level of design flexibility. In some cases, there will only be one tier of performance proposed:

- BASELINE: It is expected that all baseline targets will be achieved as good practice of sustainable building design.
- IMPROVED: These targets are based on anticipated changes to upcoming regulations to ensure the development is 'future proofed'.
- INNOVATION: These targets are based on industry recognised guidance (i.e. RIBA, LETI, etc.) indicating what is required to meet zero carbon status by 2030.

1. Solar Orientation and Building Form

ORIENTATION AND CONSIDERATIONS FOR GLAZING RATIO

The location, orientation and size of glazing can have a significant impact on energy demand and thermal comfort of a dwelling. Figure 5.47 gives an overview of the advised glazing ratios (i.e. proportion of glazed area to façade area) for the various orientations.

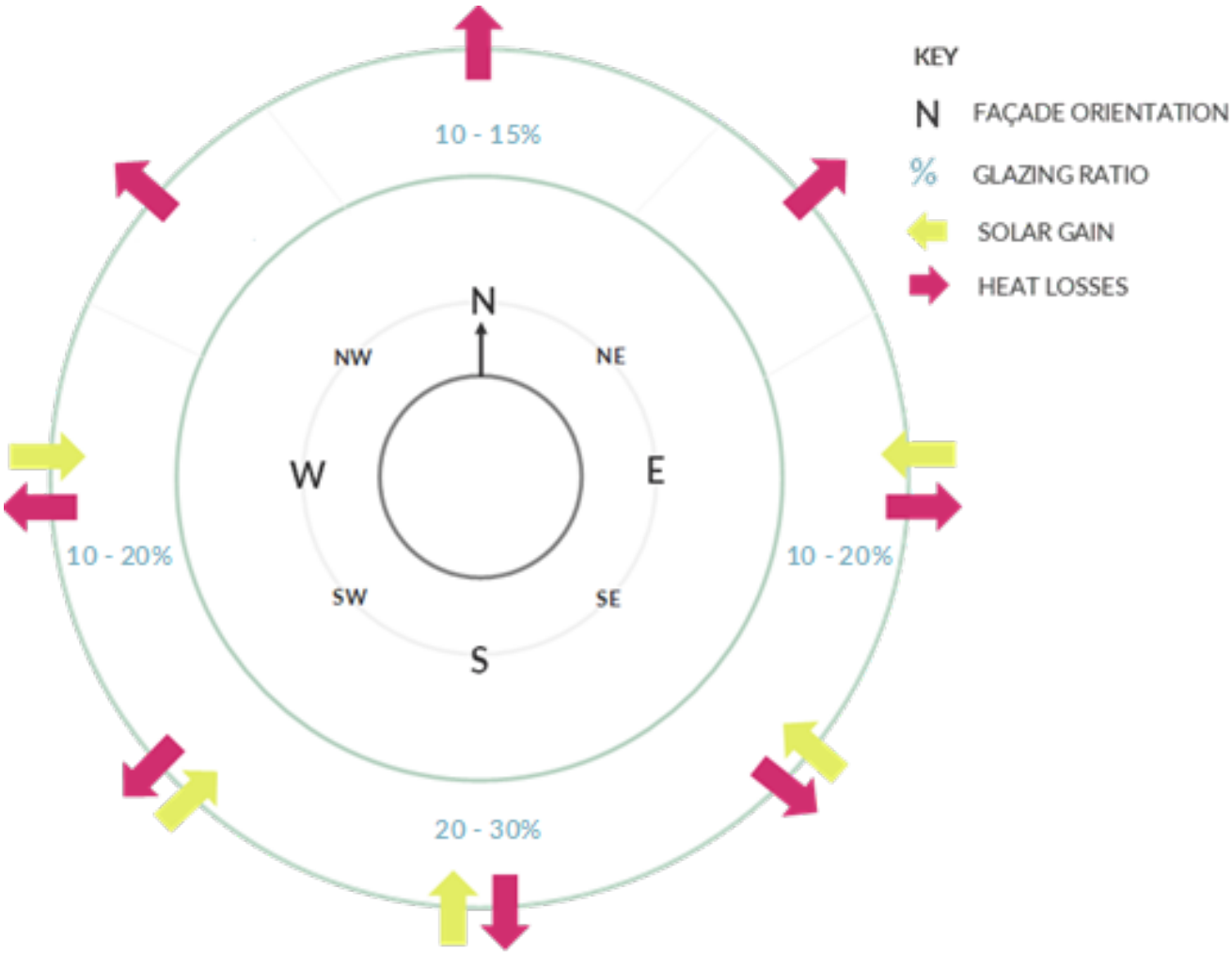


Figure 5.41: Recommended glazing ratios and orientation/location

1. Solar Orientation and Building Form

WINDOW CONFIGURATION AND DAYLIGHTING

A misconception that often occurs, is that lower glazing proportions will result in poor daylighting levels. This can be avoided when considering window positioning and configuration.

Figure 5.48 shows the impact on three window configurations that have the same area and their resultant daylight factor.

When considering impact on daylighting, a window will provide insignificant additional benefits where the sill is lower than 700mm above the floor level. Therefore, it is advised that, unless an opening consists of a door such as French or Balcony doors, windows should be designed to allow for horizontal configuration as an optimum.

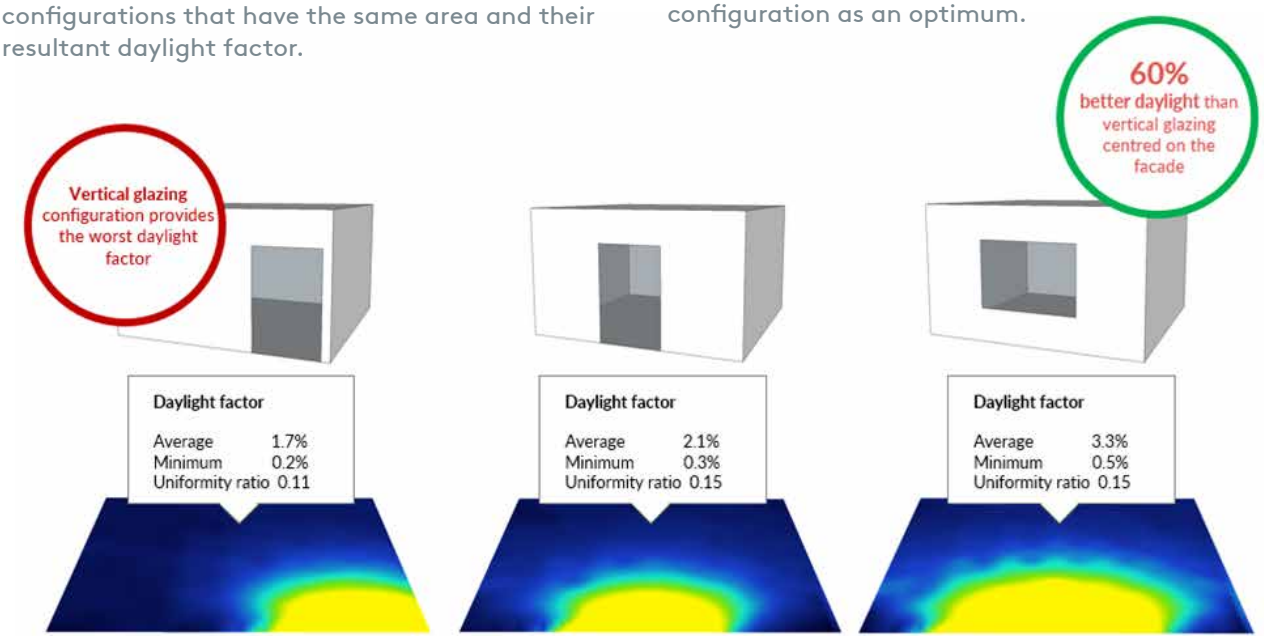


Figure 5.42: Window configuration and impact on daylighting

FAÇADE EFFICIENCY

The shape and form of a dwelling can have significant impact on energy demand in operation.

Form factor is defined as the ratio of the total heat loss area compared to the net internal floor area of a dwelling or building. Figure 5.49 provides as overview of indicative form factors of typical dwelling types, and Figure 5.50 shows how the shape of a dwelling will determine levels of heat loss.

	Type	Form Factor	Efficiency
	End mid-floor apartment	0.8	Most efficient
	Mid-terrace house	1.7	
	Semi-detached house	2.1	
	Detached house	2.5	
	Bungalow	3.0	Least efficient

Figure 5.49: Form factor associates with typical dwelling types

Solar orientation and building form	Baseline criteria	
	Target form factor	Achieved?
Glazing ratios	North orientated façade glazing ratio 10-15%	☐
	South orientated façade glazing ratio 20-30%	☐
	East or West orientated façade glazing ratio 10-20%	☐
Form factor	Mid terrace: <1.7	☐
	End of terrace / Semi-detached: <2.1	☐
	Detached: <2.5	☐
Glazing height	Windows/openings do not have sill height <700mm unless openable door (e.g. French doors)	☐

Table 1: Solar orientation and building form targets

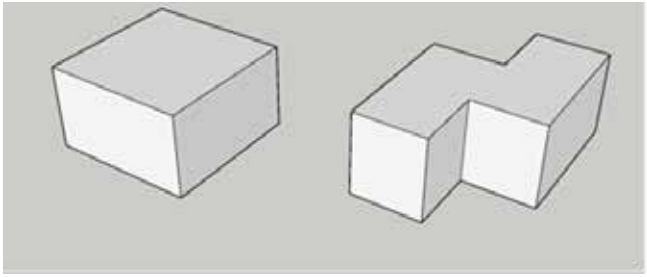


Figure 5.43: Example of impact from form factor

2. Energy

FABRIC PERFORMANCE

The specification of U-values and air permeability (i.e. how leaky the dwelling is) impacts the resultant heat loss potential of a façade and will result in either an increase or decrease in space heating demand and utility bills.

Traditionally, design has been driven by Building Regulations for legal compliance. The current adopted version of these regulations that relates to sustainable building design is Part L 2013. However, this is due to be updated for adoption in June 2022 with a further update in 2025 in the form of the Future Homes Standard.

To move towards a 'performance' rather than 'compliance' led design that is future proofed for emerging changes to policy and regulation and considers the Climate Emergency, the London Energy Transformation Initiative (LETI) produced the LETI Climate Emergency Design Guide in 2020 to "support the transition of the built environment to net zero carbon...".

ENERGY USE INTENSITY (EUI).

In order to move towards a performance led design, it is proposed that energy use intensities be used for target values rather than the traditional improvement in carbon emissions over the Part L baseline.

Part L sets agreed carbon factors for all fuel types when it is adopted. However, as it is not updated regularly, these figures quickly become outdated and stop providing a realistic picture of a development's environmental impact. Whereas the predicted energy demand is less likely to have as much of a variance in practice and can be more easily measured and monitored during operation through the use of smart meters.

The other reason why EUI's are considered a more robust form of performance is that it considers total demand, i.e. regulated and unregulated energy uses, whereas Part L considers regulated emissions only.

REGULATED ENERGY DEMAND: Energy consumed by a dwelling or building associated with fixed installation for heating, hot water, cooling, ventilation and lighting systems.

UNREGULATED ENERGY DEMAND: Energy consumed by a building that is outside of the scope of "regulated", e.g. energy associated with white goods, TVs, computers and plug in equipment.

Within the LETI Climate Emergency Design Guide and the RIBA 2030 Climate Challenge documents, a series of targets have been identified for EUIs should net zero carbon status be sought. Within this, specific targets are also set for space heating demand as these, historically, contribute to the majority of regulated energy

THE ENERGY HIERARCHY AND RENEWABLE ENERGY

When developing the energy strategy for the development, the Energy Hierarchy should be followed to adopt a "fabric first" approach to design. A definition of each stage of the hierarchy is available below.

- Be Lean: Use less energy and manage demand during operation through fabric and servicing improvements and the incorporation of flexibility measures.
- Be Clean: Exploit local energy resources (such as secondary heat) and supply energy efficiently and cleanly by connecting to district heating networks.
- Be Green: Maximise opportunities for renewable energy by producing, storing and using renewable energy on-site.

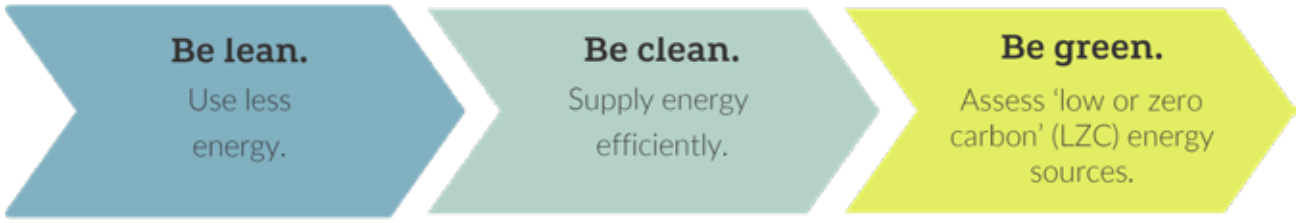


Figure 5.44: Recommended glazing ratios and orientation/location

2. Energy

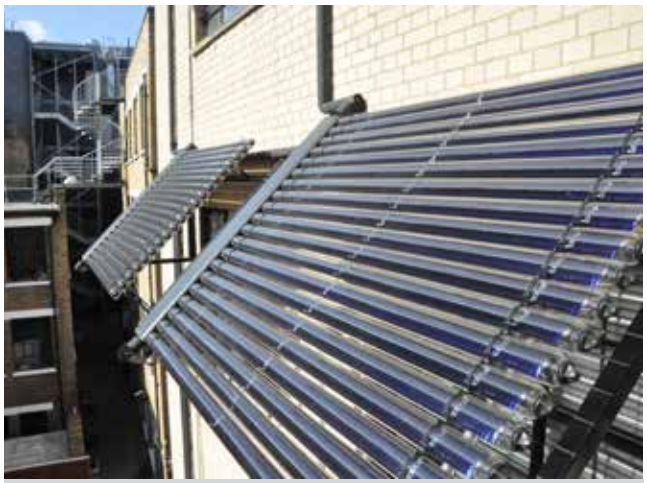
Renewable Energy

The following technologies should be considered by housebuilders within the Sustainability Statement required to be submitted as part of reserved matters applications:

- Heat pumps
- Air source heat pumps (ASHP)
- Ground source heat pumps (GSHP)
- Water source heat pumps (WSHP)
- Solar technology
- Photovoltaic (PV) panels
- Solar thermal panels

Waste

- Foul water heat recovery
- Mechanical ventilation waste heat recovery



Solar technology

Solar slates integrated into a tiled roof

Energy		Baseline target	Improved target	Innovation target
Fabric performance	Roof U-value (W/m2.K) ☐	0.11-0.16 ☐	0.10-0.12 ☐	<0.15 ☐
	Wall U-value (W/m2.K) ☐	0.18-0.26 ☐	0.13-0.15 ☐	<0.15 ☐
	Floor U-value (W/m2.K) ☐	0.13-0.18 ☐	0.08-0.10 ☐	<0.15 ☐
	Window U-value (W/m2.K) ☐	1.20-1.60 ☐	1.20-0.80 ☐	<0.85 ☐
	Air permeability ☐	<3 m3/m2.hr @50Pa ☐	<1 m3/m2.hr @50Pa ☐	0.6 ACH @50Pa ☐
	Thermal bridging ☐	y=0.05 ☐	y=0.04 ☐	All linear thermal bridges have psi value of <0.01 W/mK ☐
Energy use intensity	Total energy use intensity (kWh/m2/yr.) ☐	<120 kWh/m2/yr. ☐	<60 kWh/m2/yr. ☐	<35 kWh/m2/yr. ☐
	Space heating energy use intensity (kWh/m2/yr.) ☐	<50 kWh/m2/yr. ☐	<25 kWh/m2/yr. ☐	<15 kWh/m2/yr. ☐
Energy strategy		All energy demands met from electric sources (i.e. no combustion on site) and at least one LZC technology included within the strategy. ☐	ASHP used for all thermal demand and PV installed. ☐	ASHP used for all thermal demand and PV installed as well as an additional LZC technology ☐
Ongoing monitoring		Smart meters installed ☐	Smart meters instwalled which can report on end uses separately (e.g. space heating, hot water, lighting, etc.) ☐	

Table 2: Energy checklist targets

3. Water - Within the dwelling

SPECIFICATION OF WATER CONSUMING FITTINGS

Table 3 below provides examples of the consumption rates that would be needed to achieve a consumption rate for potable water of 110 and 100 litres/person/day (in accordance with Approved Part G methodology of Building Regulations).

Fitting	To achieve 110 litres/person/day	To achieve 100 litres/person/day
WCs (litres per flush)	<4/2.6 (dual flush)	<4/2 (dual flush) (maximum 3 litres effective flushing volume)
Showers (litres/minute)	<8	<6
Baths (litres)	<170	<170
Basin taps (litres/minute)	<5	<5
Kitchen sink taps (litres/minute)	<6	<6
Dishwasher (litres/place setting)	<1.25	<1.25
Washing machines and washer dryers (litres/kg load)	<8.17	<8.17

Table 3: Target water consumption specifications (source Home Quality Mark)

RAINWATER AND GREY WATER RECYCLING

To target lower consumption rates (i.e. the Improved and Innovation targets within the checklist), rainwater harvesting and greywater recycling would need to be considered to offset the potable water demand.

RAINWATER HARVESTING: Rainwater is collected and stored to provide the water demand for fittings that do not require water to be drinking safe, e.g. WC flushing. This would require an internal store, e.g. within roof space, and then fed to the relevant fitting.

GREYWATER RECYCLING: Wastewater from fittings such as showers, is collected and used to flush WCs. This requires specific systems to be installed to connect the two fittings which would need to be considered within the bathroom design.

3. Water - Outside the dwelling

Water use is also present for gardening and car washing which uses potable water from external taps or filled up from the kitchen/utility cupboards. As water demand for external uses is not required to be 'potable', it can be met via rainwater harvesting.

Water butts are commonly used as a method to reduce potable water demand for external uses such as gardening and irrigation. The water butts are connected to the dwelling gutters to collect rainwater and stored until needed.

Should this method also be sought for other uses such as car washing, which require a higher volume of water, this should be considered when sizing the butt.

Landscaping design can also consider potable water free systems, such as gulley's and pipes which are fed from the rainwater store to irrigate large areas of land and controlled via a tap or other shut off valve.

Energy	Baseline target	Improved target	Innovation target
Potable water	<110 litres/person/day ☐	<95 litres/person/day ☐	<75 litres/person/day ☐
Non-potable water	Rainwater collection stores installed ☐	Alternative rainwater irrigation systems installed ☐	

Table 4: Water checklist targets

4. Waste

SPECIFICATION OF WATER CONSUMING FITTINGS
THE CIRCULAR ECONOMY APPROACH

The circular economy approach seeks to retain value of materials throughout all processes to irradicate waste consumption in total. The circular economy has three main principles:

1. Conserve resources: Minimise quantities of materials used and other resources (e.g. energy, water, etc.)
2. Eliminate waste: design for longevity, adaptability or flexibility, reusability and recoverability and design out construction, demolition, excavation and operational waste.
3. Manage waste at all stages, from cradle to grave.

When developing a waste strategy in line with the Circular Economy Approach, the decision tree as shown in Figure 5.52 can be used as a tool.

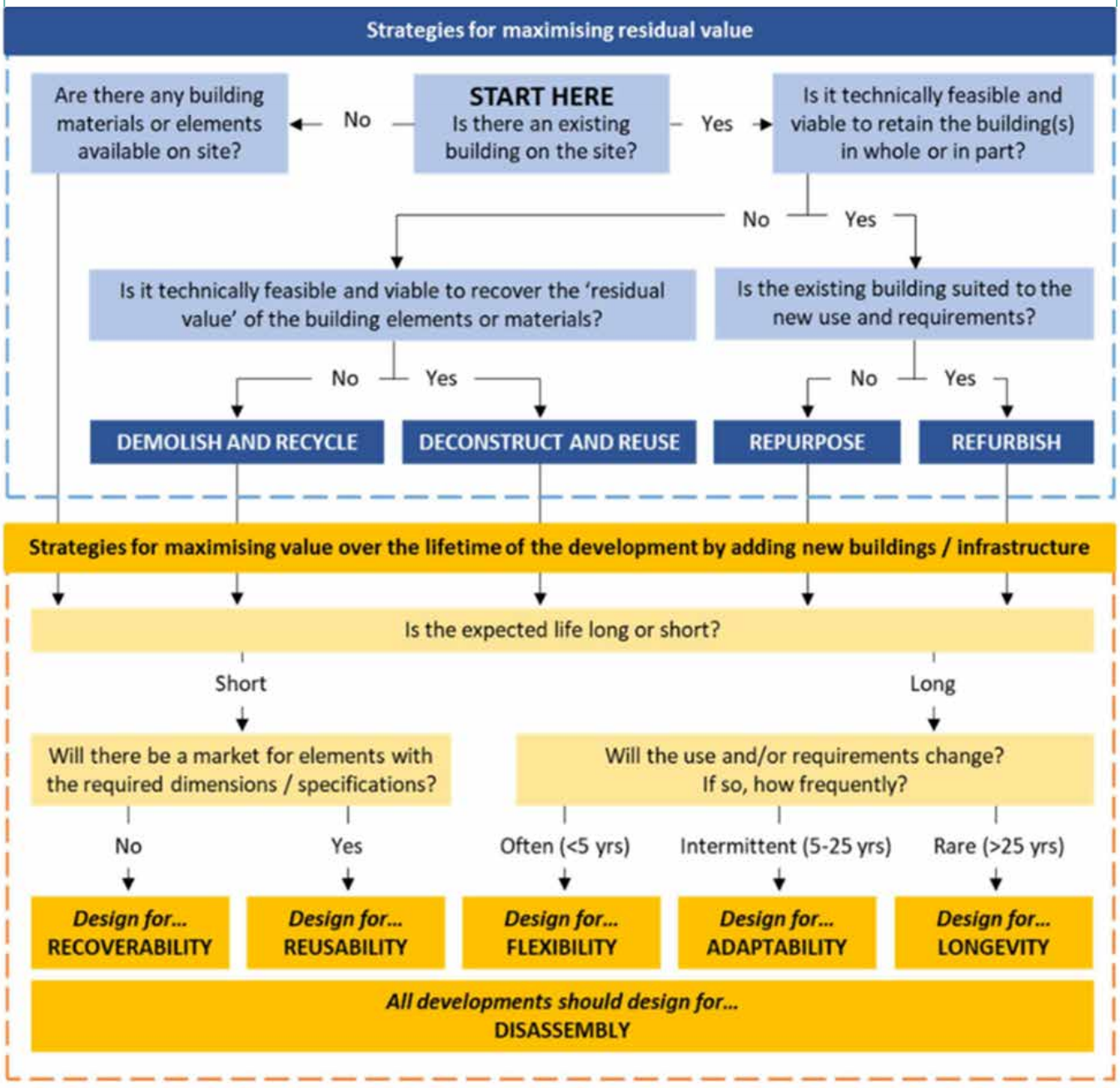


Figure 5.45: Circular Economy Decision Tree (source: Greater London Authority)

4. Waste

CONSTRUCTION WASTE

Reducing the amount of waste produced lowers the environmental impact and the cost of the construction process.

Site Waste Management Plans prepared and submitted pursuant to RMAs in KP4 should set targets for demolition, construction and excavation waste resulting from the proposed development.

Targets have been set for Baseline, Improved, and Innovation within the checklist following guidance set by the Home Quality Mark.

OPERATIONAL WASTE

The ability to impact waste management during operation, i.e. when the dwelling is occupied, is limited as each household and their associated behaviours will differ. However, by making good practice behaviours the easier option, it is more likely to be adopted.

By providing dedicated internal and external waste storage such as separate bins for municipal, recyclable and food/green waste, the occupant will be prompted to separate and manage their waste more effectively.

Sizing of internal bins should consider the frequency of bin collections to ensure good behaviour is maintained. For example, if a recycling bin is too small for frequency of collections, occupants will likely put recyclable waste in the general waste bin to avoid mess within their home.

Waste		Baseline target	Improved target	Innovation target
Circular economy		Waste strategy produced in accordance with circular economy approach ☐		
Construction waste	Waste generated	<8.5 tonnes/100m2 ☐	<4.9 tonnes/100m2 ☐	<1.9 tonnes/100m2 ☐
Diversion from landfill	Construction waste	>80% ☐	>90% ☐	100% ☐
	Demolition waste	>90%	>95%	100%
	Excavation waste	☐	>95% ☐	100% ☐
Operational waste		Internal waste storage provided for general, recyclable and food waste separately		

Table 5: Waste checklist targets

5. Overheating

A balance needs to be achieved between benefits of solar gains and minimising heat losses which avoid risk of overheating.

As fabric performance increases and facades become more airtight, heat gains that are present within a room can be harder to remove through traditional means. Purge ventilation through opening of windows becomes less effective as the external temperature is higher than the internal or operative temperatures due to the impact of climate change, so the opening of windows introduces additional heat gains.

CIBSE TM59 ASSESSMENT METHOD

The following criteria is available, dependant on the ventilation strategy:

- ADAPTIVE CRITERIA - Homes that are predominantly naturally ventilated
  - **Living rooms, kitchens and bedrooms:** The number of hours during which deltaT is greater than or equal to 1oK during the period May-September inclusive shall not be more than 3% of occupied hours.
  - **Bedrooms only:** To guarantee comfort during the sleeping hours, the operative temperature in the bedroom from 22:00-07:00 shall not exceed 26oC for more than 1% of annual hours.
- FIXED CRITERIA – Homes that are predominantly mechanically ventilated
  - **Living rooms, kitchens and bedrooms:** Occupied rooms should not exceed an operative temperature of 26oC for more than 3% of the annual occupied annual hours.

CONSIDERATION FOR FUTURE CLIMATE IMPACTS

Within the dynamic modelling assessment of TM59, the weather files can be set for three available data sets for 2020, 2050 and 2080 to consider potential future climates.

To ensure the development can be considered adaptable to climate change or climate change resilient, it is advised that the assessment is carried out to determine levels of overheating risk for the future climates to identify where mitigation measures may be required, e.g. cooling. This could inform the ventilation strategy to ensure the approach can be adapted as needed if the measures are not incorporated from day one.

Overheating	Baseline target	Improved target	Innovation target
Overheating risk assessment	An overheating risk assessment has been carried out in accordance with CIBSE TM59 ☐		
Climate change resilient	Meets relevant CIBSE TM59 criteria for 2020 climate conditions ☐	Meets relevant CIBSE TM59 criteria for 2050 climate conditions ☐	Meets relevant CIBSE TM59 criteria for 2080 climate conditions ☐

Table 6: Overheating checklist targets

5. Overheating

Key aspects of overheating assessment methodology.

MECHANICAL VENTILATION

Dwellings that are predominantly mechanically ventilated with limited opportunities for opening windows should use the fixed temperature comfort limits specified in TM59 (i.e. the operative temperature should not exceed 26°C for more than 3% of annual occupied hours.

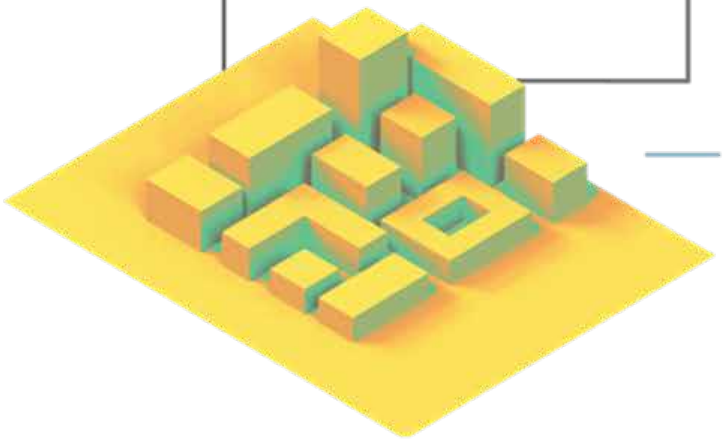
Ventilation rates from mechanical ventilation heat recovery (MVHR) units should be based on normal, acoustically acceptable modes of operation (boost mode flow rates should not be assumed).

INTERNAL BLINDS

Internal blinds should only be modelled if provided within the base-build and specified in the contract.

ROOM OCCUPANCY

Room occupancy profiles have been standardised, with bedrooms assumed to be permanently occupied (24/7). This scenario is intended to cover the condition when residents are working from home or might be house bound. If appropriate, the designer could discuss variations to proposed occupancy profiles. These assumptions should be agreed and stated in the overheating risk assessment report.



WEATHER FILES

Weather files to be used in the simulation are the Design Summer Year (DSY01) adapted for future weather (2020s High emissions 50% scenario).

NATURAL VENTILATION

Dwellings that are predominantly naturally ventilated can use the adaptive comfort conditions specified in TM59. These are less onerous than the fixed temperature comfort test.

HEAT GAIN

Heat gains from communal heating systems and the potential impact on corridors overheating should be taken into account in the risk assessment.

IDENTIFY HIGH RISK

All high risk dwellings should be identified in a development. Typical risk factors include single aspect building forms, highly glazed areas, top floor units and locations that restrict full window openings due to noise or air quality constraints.

THERMAL MODELLING

CIBSE TM59 consolidates other CIBSE guidance relating to thermal comfort in homes, in particular the thermal comfort elements of CIBSE Guide A and CIBSE TM52, and provides a summary of how homes should be assessed using dynamic thermal modelling.

Figure 5.46: Key aspects of overheating assessment methodology

6. Materials

SUSTAINABLE PROCUREMENT

Sustainable procurement considers the supply chains of the materials needed to construct the development. This includes how materials are processed, how waste is managed, environmental standards of the processes, and locality of materials from site.

By setting a sustainable procurement policy within early stages of design, it will steer material specification as well as create a process of validation during construction to ensure environmental impact is minimised where feasible.

RESPONSIBLE SOURCING OF MATERIALS

Manufacturing construction products typically involves a long and complex supply chain that results in a wide range of impacts. These may be environmental (such as toxicity or biodiversity), economic (such as corruption, for example buying or selling of wood from protected forests) or social (such as slave labour or inequality) or issues that affect all three, such as climate change.

The complete supply chain of construction products may extend to areas of the world where it is difficult to track. Responsible sourcing certification schemes (RSCS) provide a robust report on the impact of construction products.

If products are covered by a credible RSCS, consumers and those involved in designing and constructing a home can be confident that risks have been avoided or minimised.

Examples of responsible sourcing accreditation that can be included within the specification of materials include ISO14001 and BES 6001. These certification options for the supply chain ensure that sustainable and responsible sourced materials can be achieved in practice.

Ideally materials will be locally and or regionally sourced to reduce carbon emissions attributable to transporting materials to site.

EMBODIED CARBON

'Up front' emissions are those embodied emissions resulting from building construction, up to and including practical completion. This includes emissions associated with the extraction and processing of materials for building elements and the energy and water consumption in the production, assembly, and construction of a building, i.e. site construction activities.

It is possible that by day one of the building operation ~50% of life cycle emissions (including those associated with operational energy) may have been incurred. To that end, quantifying, disclosing, and reducing embodied carbon is becoming increasingly significant for the built environment.

Embodied carbon can however extend beyond 'up front' emissions and include carbon impacts from the 'in-use' phase of a building, i.e. the replacement, repair, refurbishment and maintenance of products during its life in / on the building as well as emissions associated with 'end of life' stages (demolition, dis-assembly and disposal of any parts of products or buildings). To reduce potential impacts of embodied carbon during the 'in use' phase of a building consideration should be given to more resilient materials which will require less maintenance.

As a response to mainstream scientific consensus on the urgent need to reduce carbon emissions, the UK Government has legislated to achieve Net Zero carbon by 2050.

As part of the definition of Net Zero, the UK Green Building Council (UKGBC) have developed a framework for achieving Net Zero and defines the concept (within the construction phase) as:
"When the amount of carbon emissions associated with a building's product and construction stages up to practical completion is zero or negative, through the use of offsets or the net export of on-site renewable energy".

Figure 5.54 contextualises the scope of the UKGBC Net Zero carbon – construction within the context of the life cycle modules of a building, that is modules A1 to A5 of the building life cycle:

- A1-A3: Product Stage
- A4 and A5: Construction process stage.

The guidance for reducing embodied carbon outlines by the UKGBC is to adhere to the following hierarchy:

- BUILD NOTHING – Challenge the root cause of the need, explore alternative approaches to achieve the desired outcomes.
- BUILD LESS – Maximise the use of existing assets; optimise asset operation and management to reduce the extent of new construction required.
- BUILD CLEVER – Design in the use of low carbon materials; streamline deliver processes; minimise resource consumption.
- BUILD EFFICIENTLY – Embrace new construction technologies and eliminate waste.

6. Materials

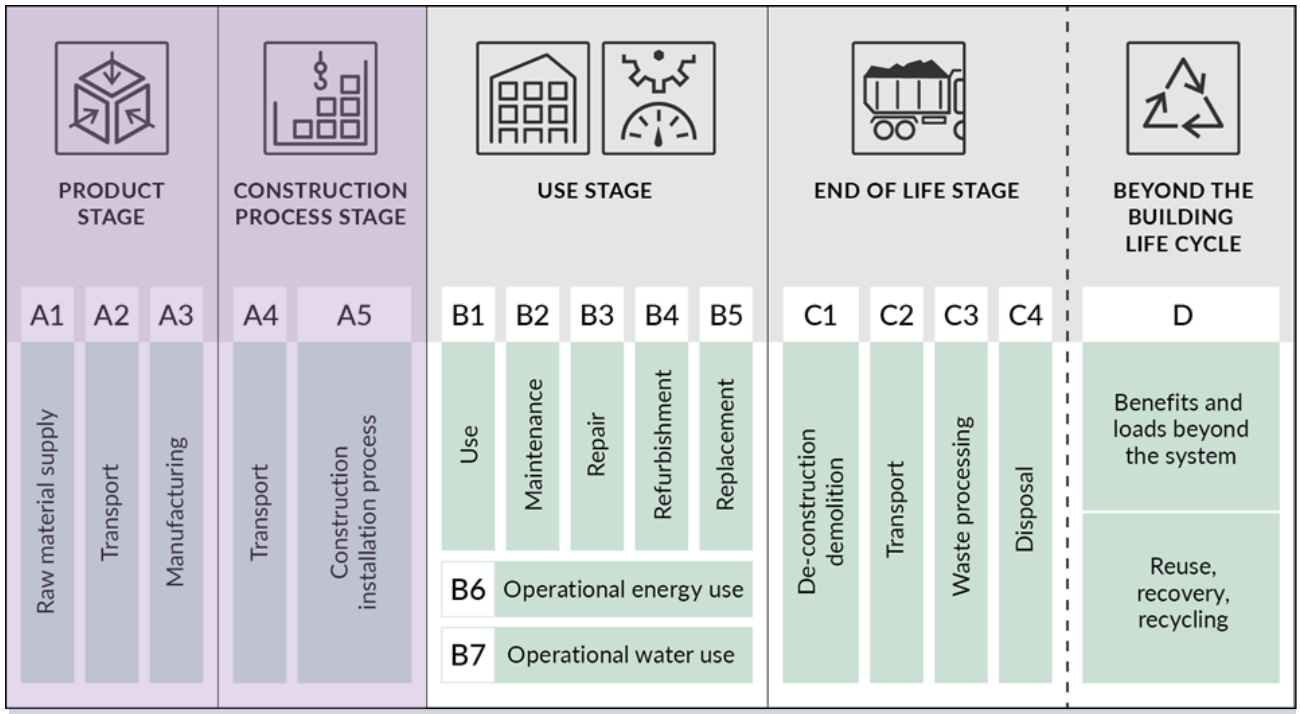


Figure 5.47: Building life cycle stages as determined by EN 15978.

INTEGRATION INTO THE DESIGN PROCESS

Whilst embodied carbon assessments can be carried out at any stage of design and / or construction, it is recommended that in order to influence design decisions and achieve desired outcomes, we would recommend that embodied carbon is considered early in the design process.

- RIBA STAGE 1/2 – Scoping, benchmarking and target setting. Establish "carbon budgets" for each building element (structure, envelope, services, finishes, etc) including consideration of the extent of refurbishment, retention and extension of the building.
- RIBA STAGE 2 – Initial appraisal of concept design options, i.e. structural solutions and materials (steel, concrete, timber), façade cladding options (aluminium, steel, stone, etc), using example Environmental Product Declarations (EPDs) and benchmark data for raw materials where simpler.
- RIBA STAGE 3 – Refined assessment of design proposals as structural, facade and MEP design develops, using cost plan to determine quantities in detail, based on aligned EPDs and raw material assessments where more representative.
- RIBA STAGE 4 – Final design stage update based on detailed specifications.
- RIBA STAGE 5 – Construction update based on "As Installed" materials.

ASSESSMENT METHOD (refer to Figure 5.54)

To assess the embodied carbon for a development, a Life Cycle Assessment (LCA) tool – One Click LCA – should be used to establish the embodied carbon of each element, based on estimated or specified materials quantities for each element. It should be noted here that the LCA tool has a limited database of materials. In the scenario where a specified material isn't included in the database, the most similar material in terms of material composition is selected instead.

[A1–A3] = Material quantity (a) × Material embodied carbon factor (b).
[A4] = Material or system mass (a) × transport distance (b) × carbon conversion factor (c)

The carbon emissions arising from any on- or off-site construction-related activities must be considered in [A5]. This includes any energy consumption for site accommodation, plant use and the impacts associated with any waste generated through the construction process, its treatment and disposal. See RICS whole life carbon assessment document for details.

6. Materials

UNDERSTANDING THE CHALLENGE

Figure 5.55 depicts an example of the breakdown of the source of embodied emissions for a typical development. Embodied carbon from frame materials contribute the largest proportion of emissions, followed by internal walls and partitions and substructure.

Figure 5.56 show the potential variances of façade specification and build up on the resultant embodied carbon of that element. When considering the embodied or up-front carbon (i.e. modules A1-A3, A4 & A5), the variances would be ~75 kgCO2/m2 with the majority of emissions coming from the Product Stage.

However, when looking at whole life emissions, construction types that use rainscreen or curtain wall have a large proportion of emissions from Replacement (i.e. module B4). For this example, traditional hand laid brick construction shows the lowest whole life emissions.

Figure 5.57 shows the importance of the selection of EPDs. This example compares a number of products' EPD for glazing, whether it be double or triple glazed. The variance can be seen even with products from the same manufacturer.

Module	Description
A1-A3 Construction materials	Raw material supply (A1) includes emissions generated when raw materials are taken from nature, transported to industrial units for processing and processed. Loss of raw material and energy are also taken into account. Transport impacts (A2) include exhaust emissions resulting from the transport of all raw materials from suppliers to the manufacturer's production plant as well as impacts of production of fuels. Production impacts (A3) cover the manufacturing of the production materials and fuels used by machines, as well as handling of waste formed in the production processes at the manufacturer's production plants until end-of-waste state.
A4 Transportation to site	A4 includes exhaust emissions resulting from the transport of building products from manufacturer's production plant to building site as well as the environmental impacts of production of the used fuel.
A5 Construction / Installation process	A5 covers the exhaust emissions resulting from using energy during the site operations, the environmental impacts of production processes of fuel and energy and water as well as handling of waste until the end-of-waste state.

Table 7: Overview of the Life Cycle Modules includes in the assessment for embodied carbon.

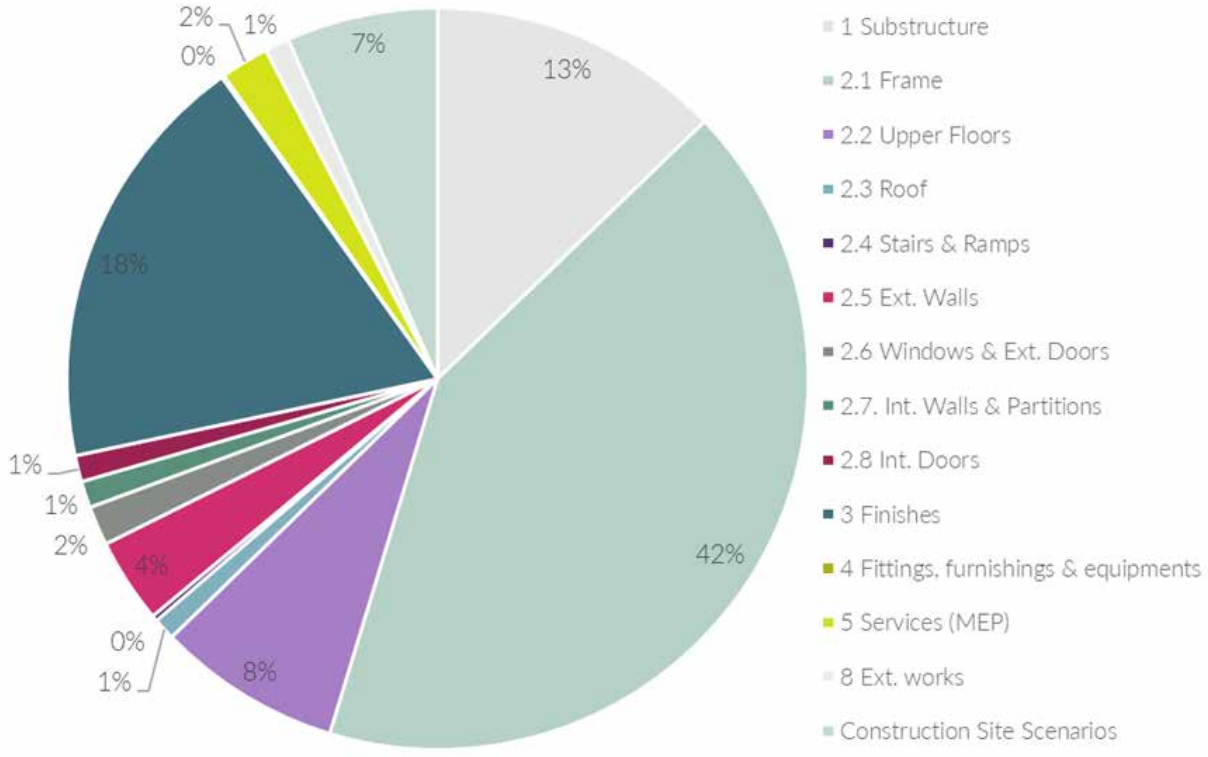


Figure 5.48: Overview of the Life Cycle Modules includes in the assessment for embodied carbon.

6. Materials

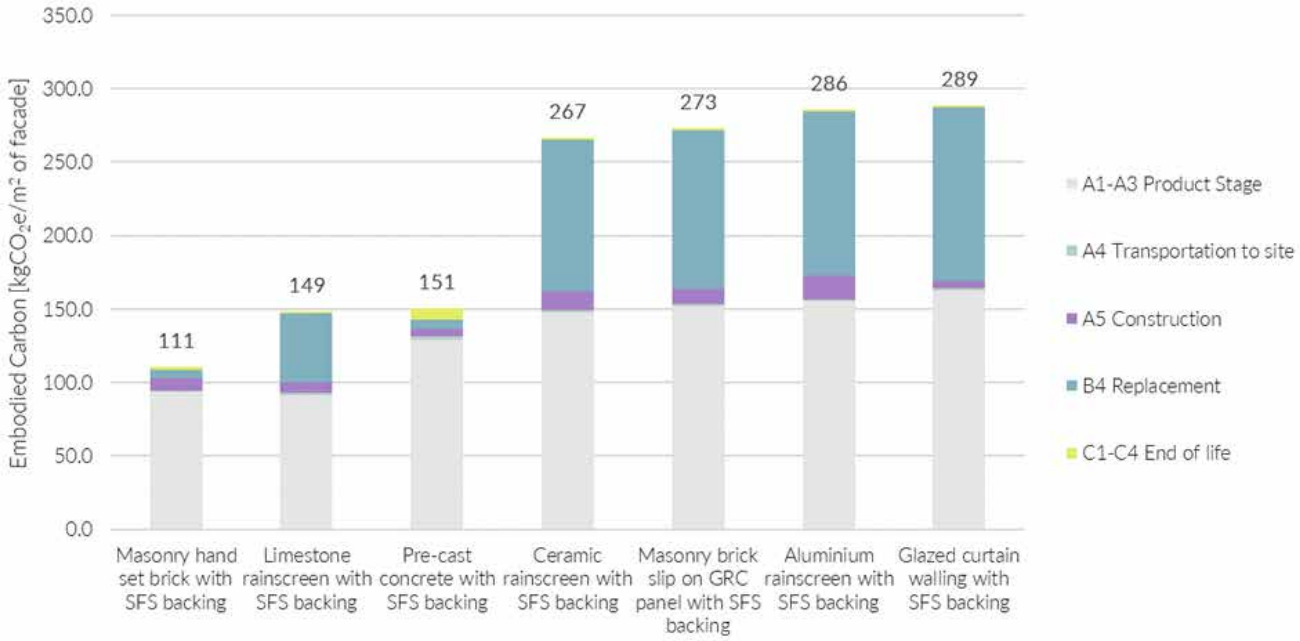


Figure 5.49: Façade construction types comparison.

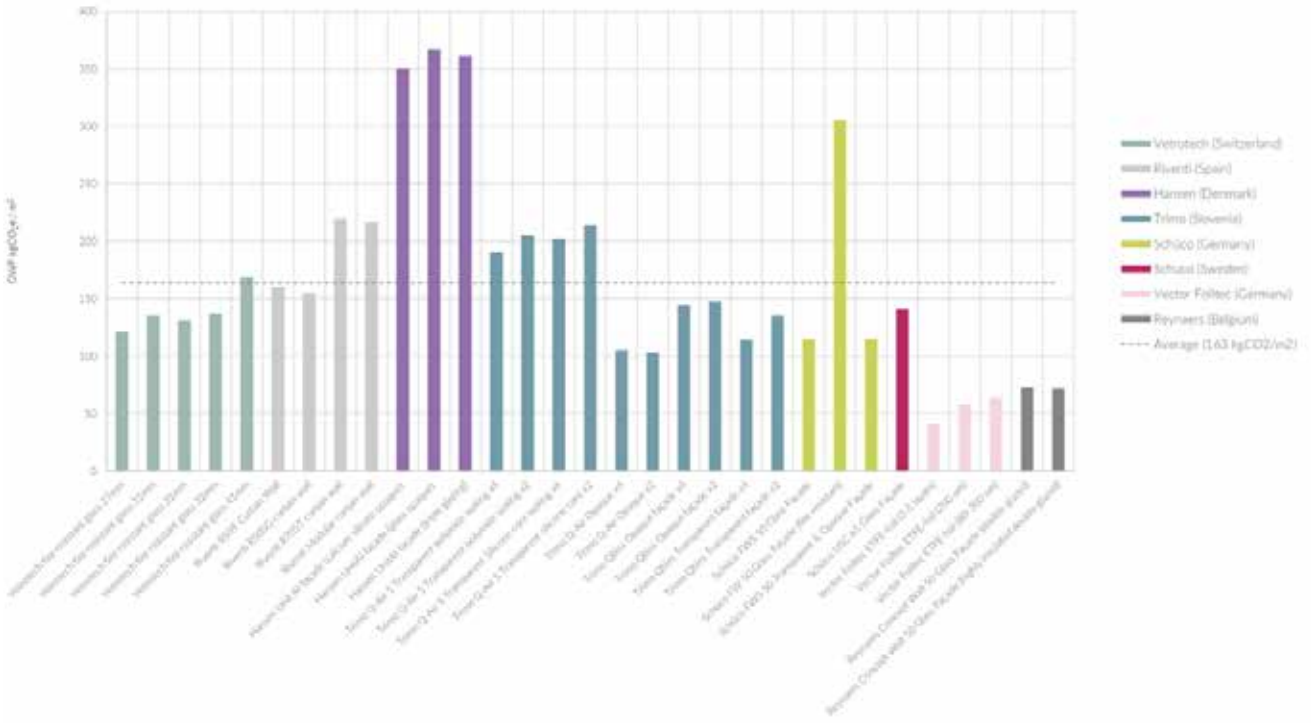


Figure 5.50: EDP comparisons - glazing.

Materials		Baseline target	Improved target	Innovation target
Sustainable procurement		A sustainable procurement plan has been developed at RIBA stage 2 and included within the contractor requirements. ☐		
Responsible sourcing		All materials will be procured from a supplier that can demonstrate they hold either ISO 14001 or BES 6001 certification. ☐		
Embodied carbon	Up front emissions	<1,200 kgCO2e/m2 ☐	<800 kgCO2e/m2 ☐	<625 kgCO2e/m2 ☐

Table 8: Materials checklist targets

Sustainable Building Design Checklist

		Baseline target	Improved target	Innovation target
1. Solar orientation and building form				
Glazing ratios	North orientated façade	10-15% ☐		
	South orientated façade	20-30% ☐		
	East or West orientated façade	10-20% ☐		
Form factor	Mid terrace	<1.7 ☐		
	End of terrace	<2.1 ☐		
	Detached	<2.5 ☐		
Glazing ratio	Glazing ratio	Windows / openings do not have sill height <700mm unless openable door ☐		
2. Energy				
Fabric performance	Roof U-value (W/m2.K)	0.11-0.16 ☐	0.10-0.12 ☐	<0.15 ☐
	Wall U-value (W/m2.K)	0.18-0.26 ☐	0.13-0.15 ☐	<0.15 ☐
	Floor U-value (W/m2.K)	0.13-0.18 ☐	0.08-0.10 ☐	<0.15 ☐
	Window U-value (W/m2.K)	1.20-1.60 ☐	1.20-0.80 ☐	<0.85 ☐
	Air permeability	<3 m3/m2.hr @50Pa ☐	<1 m3/m2.hr @50Pa ☐	0.6 ACH @50Pa ☐
	Thermal bridging	y=0.05 ☐	y=0.04 ☐	All linear thermal bridges have psi value of <0.01 W/mK ☐
Energy use intensity	Total energy use intensity (kWh/m2/yr.)	<120 kWh/m2/yr. ☐	<60 kWh/m2/yr. ☐	<35 kWh/m2/yr. ☐
	Space heating energy use intensity (kWh/m2/yr.)	<50 kWh/m2/yr. ☐	<25 kWh/m2/yr. ☐	<15 kWh/m2/yr. ☐
Energy strategy		All energy demands met from electric sources (i.e. no combustion on site) and at least one LZC technology included within the strategy. ☐	ASHP used for all thermal demand and PV installed. ☐	ASHP used for all thermal demand and PV installed as well as an additional LZC technology ☐
Ongoing monitoring		Smart meters installed ☐	Smart meters installed which can report on end uses separately (e.g. space heating, hot water, lighting, etc.) ☐	
3. Water				
Potable water		<110 litres/person/day ☐	<95 litres/person/day ☐	<75 litres/person/day ☐
Non-potable water		Rainwater collection stores installed ☐	Alternative rainwater irrigation systems installed ☐	

Table 9: Full sustainable building design checklist.

Sustainable Building Design Checklist

4. Waste				
Circular economy		Waste strategy produced in accordance with circular economy approach ☐		
Construction waste	Waste generated	<8.5 tonnes/100m2 ☐	<4.9 tonnes/100m2 ☐	<1.9 tonnes/100m2 ☐
Diversion from landfill	Construction waste	>80% ☐	>90% ☐	100% ☐
	Demolition waste	>90% ☐	>95% ☐	100% ☐
	Excavation waste	- ☐	>95% ☐	100% ☐
Operational waste		Internal waste storage provided for general, recyclable and food waste separately ☐		
5. Overheating				
Overheating risk assessment		An overheating risk assessment has been carried out in accordance with CIBSE TM59 ☐		
Climate change resilient		Meets relevant CIBSE TM59 criteria for 2020 climate conditions ☐	Meets relevant CIBSE TM59 criteria for 2050 climate conditions ☐	Meets relevant CIBSE TM59 criteria for 2080 climate conditions ☐
6. Materials				
Sustainable procurement		A sustainable procurement plan has been developed at RIBA stage 2 and included within the contractor requirements. ☐		
Responsible sourcing		All materials will be procured from a supplier that can demonstrate they hold either ISO 14001 or BES 6001 certification. ☐		
Embodied carbon	Up front emissions	<1,200 kgCO2e/m2 ☐	<800 kgCO2e/m2 ☐	<625 kgCO2e/m2 ☐

Table 9: Full sustainable building design checklist.

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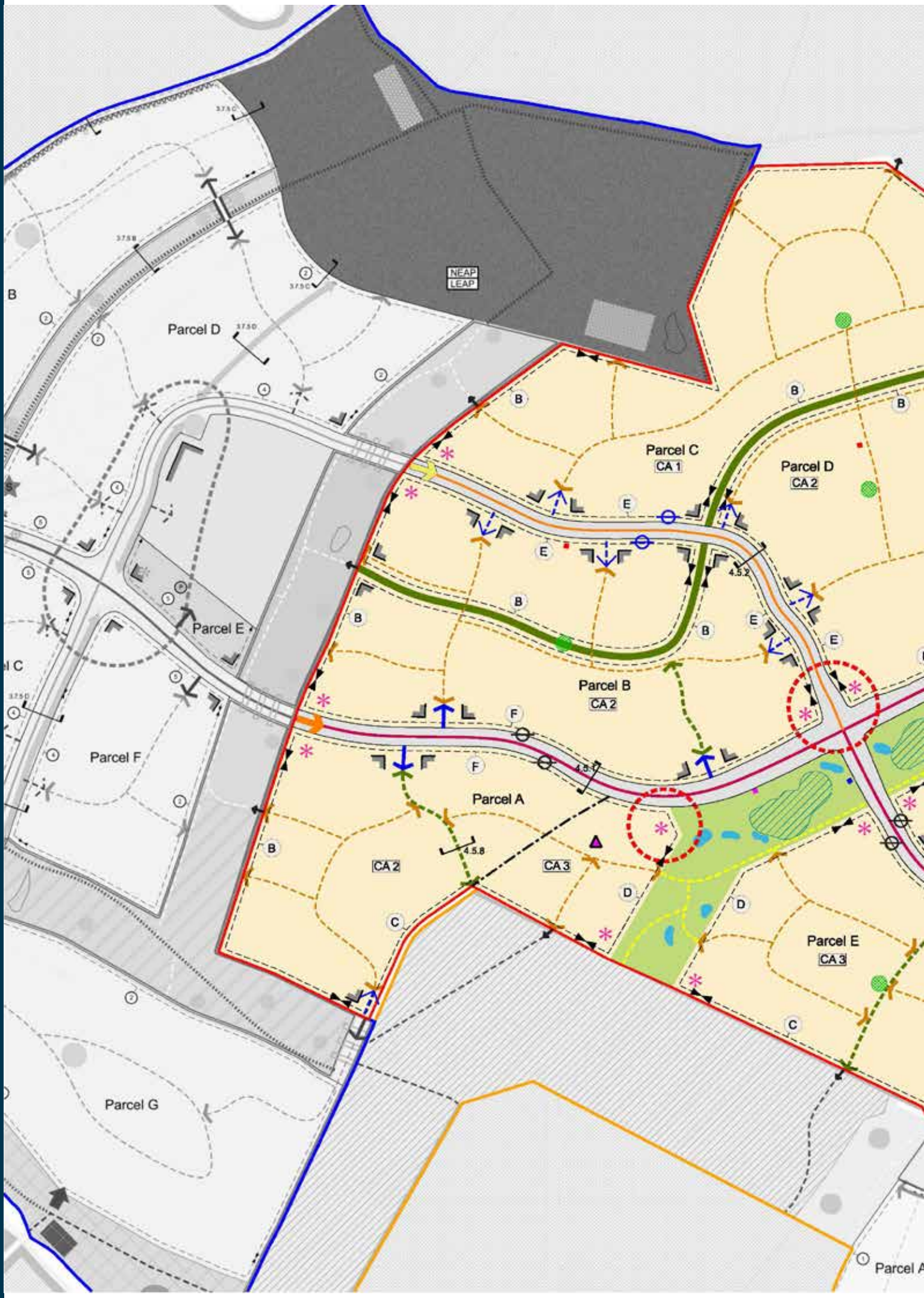
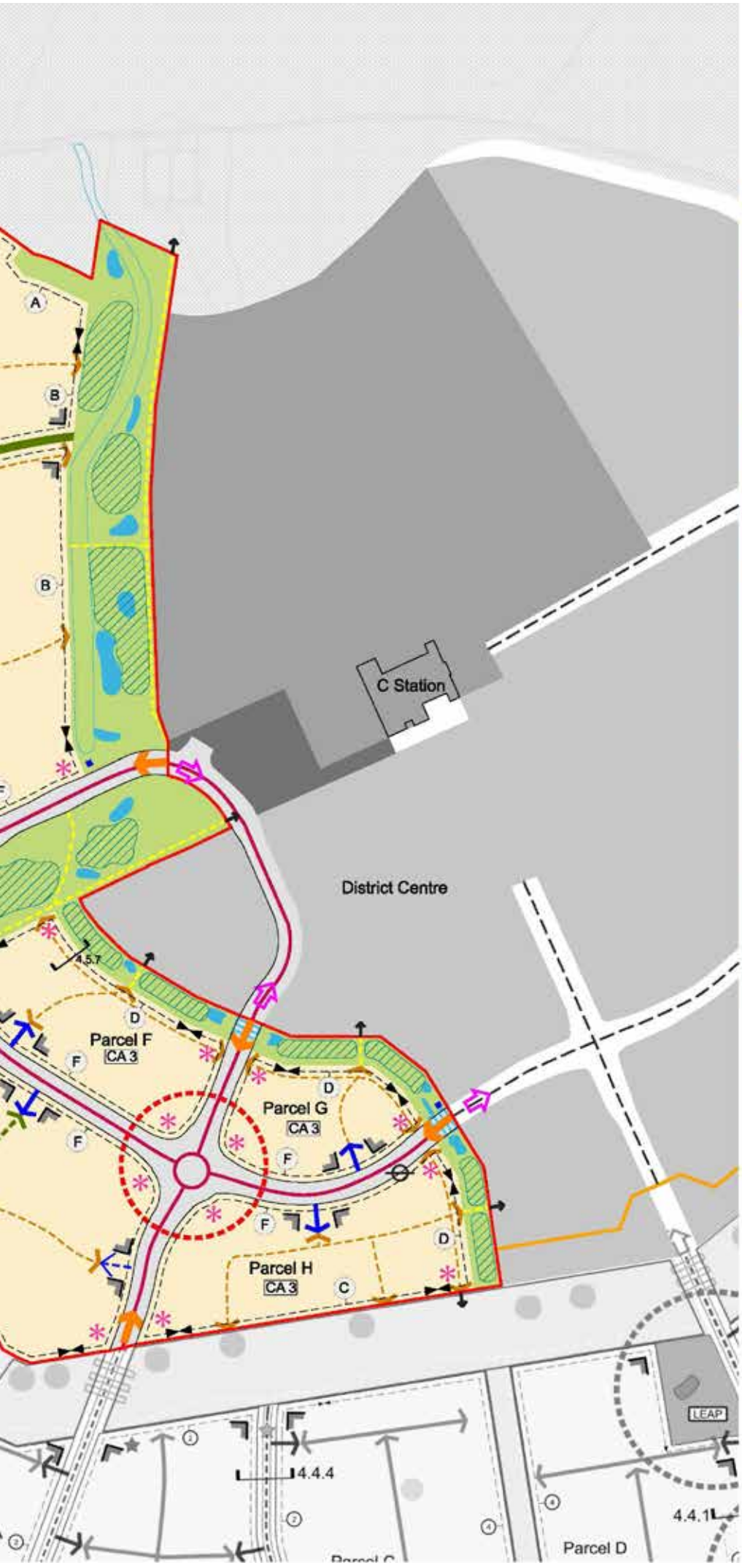
APPENDICES

Appendix A1

KP4 Regulatory Plan


NEAP
LEAP
Parcel D
Parcel C
CA 1
Parcel D
CA 2
Parcel E
Parcel B
CA 2
Parcel F
Parcel A
CA 2
CA 3
Parcel E
CA 3
Parcel G
Parcel A



Notes:

All contractors must visit the site and be responsible for taking and checking Dimensions.
All construction information should be taken from figured dimensions only.
Any discrepancies between drawings, specifications and site conditions must be brought to the attention of the supervising officer.
This drawing and the works depicted are the copyright of JTP.

This drawing is for planning purposes only. It is not intended to be used for construction purposes. Whilst all reasonable efforts are used to ensure drawings are accurate, JTP accept no responsibility or liability for any reliance placed on, or use made of, this plan by anyone for purposes other than those stated above.

KEY

PART A: CONTEXT

1. Introduction
- Key Phase 4 Planning Application Boundary
- Key Phase 3 Boundary
- Key Phase 2 Boundary
- Building heights up to 15m permitted in this area. Refer to OPA DFP Building Heights Parameter Plan, Section 1.3 of the Design Guide.

2. KP4 Context and Vision
- Residential Land Use

PART B: OPEN SPACE AND MOVEMENT

3. Landscape and Public Realm Design

3.4 Informal Open Space
- 3.4.1 Wildlife Corridors
- 3.4.2 Green Corridor
- 3.4.3 Residential Pocket Parks

3.6 Foul and Surface Water Management:
- Attenuation basin (dry)
- Wet pond
- GCN tunnels

4. Movement and Access

4.2 Access Points
- Site access point off primary street (fixed location)
- Site access point off secondary street
- Onward connection to future phases
- Vehicular access point: fixed location
- Vehicular access point: indicative location

4.3 Cycling and Pedestrian Network
- Footpath within green infrastructure
- Access locations for pedestrian and cycle connections

4.4 Bus Network
- Fixed bus stop location along Primary Street
- Indicative bus stop location along Secondary Street

4.5 Street Hierarchy
- 4.5.1 Primary Street (constructed)
- 4.5.2 Secondary Street
- 4.5.3 Cross Parcel Permeability and Tertiary Streets*
- 4.5.5 Tertiary Green Street*

*N.B. Alignment is indicative and should be designed at RMA stage

- Street sections as drawn in the Design Guide

PART C: SPATIAL

3. Built Form
- 5.5.1 Marker Buildings
- 5.5.2 Gateway Buildings
- 5.5.3 Key Groupings

5.7 Frontage Character Typology
- 5.7.4 Northern Edge
- 5.7.5 Green Interface
- 5.7.6 Southern Edge
- 5.7.7 District Centre Interface and Central Wildlife Corridors
- 5.7.8 Secondary Steet
- 5.7.9 Primary Street

5.9 Character Areas
- CA X Character area
- Character area boundary

5.10 Utility Supplies
- Existing sub station location
- Indicative proposed sub station location
- Existing gas PRI location

Note: Regulatory Plan to be read in conjuction with the Design Guide.

Rev	Date	Description	Drawn	Chkd
P4	11.01.22	Council's comments addressed	VB	GP
P3	15.11.21	Council's comments addressed	VB	GP
P1	19.04.21	First issue	VB	GP

Drawing Status
PLANNING

Client
Urban & Civic

jtp
JTP Studios
Unit 5, The Rum Warehouse
Pennington Street
London, E1W 2AP
+44 (0)20 7017 1780
www.jtp.co.uk

Project
Houlton, Key Phase 4

Drawing Title
Regulatory Plan

Scale @ A1 1:2000 | Job Ref. 00719T
Drawing No. 00719T _ RP_01 | Revision P4
Scale Bar 0 20 40 60 80 100m

Appendix A2

KP4 Compliance Checklist

RUGBY RADIO STATION - KEY PHASE THREE DESIGN GUIDE COMPLIANCE CHECKLIST

Reserved Matters Application details:

Phase	
Parcel reference	
Developer	
Design team	

Notes:

Wherever 'No' is answered to any compliance question, an explanatory statement justifying non-compliance is required.

Explanatory statements will be submitted in support of the completed Compliance Checklist.

This Design Guide Compliance Checklist will be completed and submitted with all Reserved Matters Planning Applications.

Tick boxes as appropriate: Yes ☑ No ☐ N/A ☐

REGULATORY PLAN

	Are proposals compliant? Yes	No	N/A
Proposals have referred to the Regulatory Plan	☐	☐	☐
Submitted material includes a layout plan that is in accordance with the Regulatory Plan (proposal overlaid on Regulatory Plan)	☐	☐	☐

PART A: CONTEXT

	Are proposals compliant? Yes	No	N/A
Chapter 1 – Introduction			
1.1 – Planning Context	☐	☐	☐
1.2 – The Tiered Approach	☐	☐	☐
1.3 – The Parameter Plans	☐	☐	☐
1.4 – Overview of the Design Guide Contents	☐	☐	☐
1.5 – How to Read the Design Guide	☐	☐	☐
1.6 – Using the Design Guide	☐	☐	☐
1.7 – The Regulatory Plan	☐	☐	☐
1.8 – How to use the Regulatory Plan	☐	☐	☐
1.9 – Design Code Compliance Checklist	☐	☐	☐
Chapter 2 – KP4 Context & Vision			
2.1 – Existing KP4 Context	☐	☐	☐
2.2 – Existing KP4 Site Features Overview	☐	☐	☐
2.3 – The Vision for KP4	☐	☐	☐
2.4 – Design Objectives for KP4	☐	☐	☐
2.5 – The Master Developer	☐	☐	☐

PART B: OPEN SPACE & MOVEMENT

	Are proposals compliant? Yes	No	N/A
Chapter 3 – Landscape & Public Realm Design			
3.1 – Green Infrastructure 'Guiding Design Principles' Overview	☐	☐	☐
3.2 – Access to Formal Open Spaces	☐	☐	☐
3.3 – Key Landscape Grouping: Central Primary Street & Wildlife Corridor	☐	☐	☐
3.4 – Informal Open Space	☐	☐	☐
3.4.1 – Informal Open Space: Wildlife Corridors & Ecology	☐	☐	☐
3.4.2 – Informal Open Space: Green Corridors	☐	☐	☐
3.4.3 – Informal Open Space: Informal Play & Pocket Parks	☐	☐	☐
3.5 – Parcel Landscapes	☐	☐	☐
3.6 – Surface and Foul Water Management Strategy	☐	☐	☐
3.7 – Water Body Design and Management of Risk	☐	☐	☐
3.8 – Public Realm Materials	☐	☐	☐
3.9 – Street Furniture	☐	☐	☐
3.10 – Wayfinding Strategy	☐	☐	☐
3.11 – Public Art	☐	☐	☐
3.12 – Planting Palette and Strategy	☐	☐	☐
3.13 – Trees and Hedgerows	☐	☐	☐
3.14 – Lighting	☐	☐	☐
Chapter 4 – Movement & Access			
4.1 – Movement & Access	☐	☐	☐
4.2 – Access Points	☐	☐	☐
4.3 – Cycling & Pedestrian Network	☐	☐	☐
4.4 – Bus Network	☐	☐	☐
4.5 – Street Hierarchy	☐	☐	☐
4.5.1 – Street Hierarchy: Primary Streets	☐	☐	☐
4.5.2 – Street Hierarchy: Secondary Streets	☐	☐	☐
4.5.3 – Cross Parcel permeability & Tertiary Streets	☐	☐	☐
4.5.4 – Street Hierarchy: Tertiary Street (Option 1)	☐	☐	☐
4.5.5 – Street Hierarchy: Tertiary Street (Option 2)	☐	☐	☐
4.5.6 – Street Hierarchy: Tertiary Street (Option 3)	☐	☐	☐
4.5.7 – Street Hierarchy: Tertiary Street: Next to Landscape	☐	☐	☐
4.5.8 – Street Hierarchy: Tertiary Green Street	☐	☐	☐
4.5.9 – Street Hierarchy: Tertiary Streets as Spaces	☐	☐	☐
4.5.10 – Street Hierarchy: Shared Private Drives	☐	☐	☐
4.6 – Speed Restraint Features	☐	☐	☐
4.7 – Vehicular Parking	☐	☐	☐
4.8 – Cycle Parking	☐	☐	☐

PART C: SPATIAL

Chapter 5 – Residential Built Form

	Are proposals compliant? Yes	No	N/A
5.1 - Residential Built Form guiding design principles overview	☐	☐	☐
5.2 - How to read this chapter	☐	☐	☐
5.3 - Understanding and using the Regulatory Plan	☐	☐	☐
5.4 - Parcel Permeability and Pocket Parks	☐	☐	☐
5.4.1 - Parcel Permeability	☐	☐	☐
5.4.2 - Pocket Parks and Incidental Informal Spaces	☐	☐	☐
5.5 - Marker Buildings, Gateway Buildings and Key Groupings	☐	☐	☐
5.5.1 - Marker Buildings	☐	☐	☐
5.5.2 - Gateway Buildings	☐	☐	☐
5.5.3 - Key Groupings	☐	☐	☐
5.6 - Key Groupings	☐	☐	☐
5.6.1 - Key Grouping 1: Primary Street & Wildlife Corridor	☐	☐	☐
5.6.2 - Key Grouping 2: Central Primary Street, Secondary Street and District Centre Approach	☐	☐	☐
5.6.3 - Key Grouping 3: Central Primary Street and Southern District Centre Approach	☐	☐	☐
5.7 - Frontage Character	☐	☐	☐
5.7.1 - How to read the Frontage Character spreads	☐	☐	☐
5.7.2 - Frontage Character Components	☐	☐	☐
5.7.3 - Frontage Character Components	☐	☐	☐
5.7.4 - Frontage Character A: Northern Edge	☐	☐	☐
5.7.5 - Frontage Character B: Green Interface	☐	☐	☐
5.7.6 - Frontage Character C: Southern Edge	☐	☐	☐
5.7.7 - Frontage Character D: District Centre Interface and Central Wildlife Corridor	☐	☐	☐
5.7.8 - Frontage Character E: Secondary Street	☐	☐	☐
5.7.9 - Frontage Character F: Primary Street	☐	☐	☐
5.8 - Urban Design Principles	☐	☐	☐
5.8.1 - Residential Layout Principles	☐	☐	☐
5.8.2 - Residential Streetscene Principles	☐	☐	☐
5.9 - Inner Parcels Character Areas	☐	☐	☐
5.9.1 - Clifton Brook South	☐	☐	☐
5.9.2 - Central Neighbourhood	☐	☐	☐
5.9.3 - Normandy Hill North	☐	☐	☐
5.10 - Residential Materials application	☐	☐	☐
5.11 - Plot and Building Features	☐	☐	☐
5.12 - Dwelling Typologies Library	☐	☐	☐
5.13 - Parking Typologies Library	☐	☐	☐
5.13.1 - Principles for Parking Court Design	☐	☐	☐
5.14 - Boundary Typologies Library	☐	☐	☐
5.15 - Safety & Security Principles	☐	☐	☐
5.16 - Refuse and Recycling Strategy	☐	☐	☐
5.17 - Private Amenity Space	☐	☐	☐
5.18 - Utility Supplies	☐	☐	☐
5.19 - Sustainable Building Design	☐	☐	☐

Appendix A3

Validation Lists

HOUSEBUILDER RMA VALIDATION CHECKLIST

This Briefing Note has been prepared by David Lock Associates (DLA) to outline likely validation requirements for Rugby Borough Council (RBC) for Housebuilder Reserved Matters Application (RMA) within KP4.

This takes into account requirements of the conditions of the outline planning permission (OPP) (R17/0022) and, where applicable, reference to the condition which requires those details is made or whether it is a national requirement as set out in the National Planning Policy Framework (NPPF) or National Planning Practice Guidance (NPPG), or a likely local requirement by RBC.

This checklist does not stipulate all the details likely to be required on the relevant plans and does not apply to RMA submissions made 'outside of a Key Phase'. These validation requirements are subject to confirmation with RBC.

Reports/Forms			
DESCRIPTION	SOURCE	RESPONSIBILITY	COMPLETE (Y/N)
Covering Letter with Condition 15 Checklist			
Planning Application Forms and Fee	National		
Planning Statement	National		
Design Guide Compliance Statement including design rationale component	Condition 13		
Ecological Implementation Plan demonstrating principles set out in site wide Landscape and Ecological Mitigation, Enhancement and Management Strategy (LEMEMS) and referring to ecological mitigation already undertaken in KP2	Condition 15ix Condition 12(b) Condition 14		
Landscape Strategy including Programme of Works and Details of Public Realm/Public Art (where proposed) including Delivery and Maintenance Report and Palisade/Security Fencing Dismantling Programme	Likely requirement Condition 15vxv		
Drainage Statement / Flood Risk Statement with regard to Key Phase Foul and Surface Water Drainage Strategy and including details of enhancement and mitigation strategy taking into account impacts on Clifton Brook and Water Framework Directive assessment	Submitted under Condition 15 with Key Phase Strategy submitted under condition 12(c)		
Site Waste Management Statement	Condition 15xii		
Sustainability Compliance Statement	Condition 15x and 16		
Noise Mitigation Strategy which should refer to the 'Baseline Noise Report, Rugby Radio Sustainable Urban Extension, Rugby - RPS Group, 01 April 2016'.	Condition 62		
Contamination Statement	Condition 15viii		
Road Safety Audit	WCC requirement		

Drawings/Plans			
DESCRIPTION	SOURCE	RESPONSIBILITY	COMPLETE (Y/N)
Application Plans			
Site Location Plan	National		
Existing Topography Plan	Condition 15i		
Site Layout	Condition 15ii, 15iii and 15xix		
Levels Plan showing Finished Floor levels of dwellings and proposed finished site levels for all development and spot levels on adjoining land.	Condition 15i		
Elevations	Condition 15ii		
Floor Plans	Condition 15ii		
Roof Plans	Condition 15ii		
Section Drawings	Condition 15ii		
Materials Plans / Schedules			
House types			
Streetscapes			
Foul and Surface Water Drainage General Arrangement Plans			
Waste Collection Points	Condition 15xii		
Highways and Access			
Infrastructure General Arrangement Plan including Strategic footpaths and cycleways and limits of highway adoption	Condition 15xx		
Sections – vertical and horizontal alignment	National		
Utilities Plan (including substations, water supply and fire hydrant locations)	Condition 15xiii and 15xvi		
Street Lighting Plan (if available)			
Visibility Splays/ tracking plans	WCC Requirement		
Landscape			
General Arrangement (including details of soft and hard landscaping, street furniture, lighting)	Condition 15xi and 15xi		
Boundary Treatments Details	Condition 15 iv		
Requirements for RMAs with level differences of 1m+ between finished floor levels of adjoining dwellings			
Cross-section plans	Condition 15i, specific RBC request		
Cut and fill plan (for significant earthworks)	Condition 15i, specific RBC request		
Retaining walls and other associated boundary treatments	Condition 15i, specific RBC request		

NOTES:

Although not part of the validation requirements, attention is drawn to Condition 17 of the Outline Planning Permission.

Condition 17, which should be read in full, relates to a Code of Construction Practice (Part C) needing to have regard to Codes of Construction Practice A and B which will have been prepared at site wide (Tier 1) and Key Phase wide (Tier 2) stages. This is required to be prepared prior to the commencement of development. It is anticipated that the document will be submitted to Rugby Borough Council for information purposes.

WCC VALIDATION LIST

The details below set out the current expectations of the Highway Authority in terms of what they would expect to be submitted from a highways perspective for a residential reserved matters application. This is to ensure that the application can be validated efficiently and to try and reduce delays in determining the application.

Documents	
DESCRIPTION	COMPLETE (Y/N)
Road Safety Audit Stage 1	
Transport Statement (should a residential RMA vary from agreed position established in Site Wide Highway Model)	

Drawings	
DESCRIPTION	COMPLETE (Y/N)
Areas proposed for adoption	
Areas proposed to be maintained privately	
Access road radii geometry	
Access road width (particularly where there are changes)	
Treatment of junctions (in relation to speed restraint features)	
Visibility splays at junctions, speed control bends, changes in alignment (which will require forward stopping sight distance, accesses (including pedestrian visibility splays)	
Tracking / swept path analysis (see specification overleaf)	
Surface material and any changes	
Communal bin storage collection points (within 25m of the public highway)	
Annotated details of TROs, highway lining etc	
Street tree locations to be adopted.	

Appendix A4

Indicative KP4 Phasing

Infrastructure Phase

Residential Phase

Appendix A5

Glossary of Terms

GLOSSARY OF TERMS

TERM	DEFINITION
Active frontage	A building front that promotes activity and encourages movement between the building at public realm level and the adjacent public realm by the way the building front is designed or orientated.
Amenity Space	Open space, private or public, that provides open space amenity for the occupiers in surrounding buildings.
Building line	Where the elevation of a building meets the ground.
Character Area	Each development parcel is split into character areas where the outlined architecture, design, density, massing and landscape should be reflected in the proposed detailed design.
Clifton Brook	Clifton Brook runs through the centre of the wider Houlton Site and through KP4.
CPS	Central Primary Street. Named Houlton Way connecting the Link Road from Clifton Road through KP3 and KP2.
C Station	Grade II listed Building that historically was used to transmit radio signals and communications during the 1920s. C Station is now being converted into the central part of Houlton's secondary school to be known as 'Houlton School', scheduled to open in September 2021.
DAS	Design and Access Statement
Detailed Design	Design taking place at Reserved Matters stage.
Development parcel	An area within the Key Phase where a number of buildings, open spaces and secondary streets are proposed.
Frontage	Portion of building facing onto a particular street or open space.
FOG	Flats over garages
GCN	Great Crested Newts
Green Streets	Tertiary / secondary streets that include an additional strip of soft landscaping but still function as a typical tertiary / secondary street.
Hard / Soft Landscaping	Hard landscaping is the provision of features such as paving, lighting, seating, etc. whilst soft landscaping is the provision of plants, shrubs and trees to improve the quality of the environment.
KP1	Key Phase 1
KP2	Key Phase 2
KP3	Key Phase 3
KP4	Key Phase 4
Key buildings	Key buildings are buildings that stand out through architectural expression and design ambition which are located in particular locations so that they frame or terminate views and long vistas.
Key groupings	Buildings and public spaces in Key groupings must respond to the surrounding built and natural environment through an adapted floor plan and elevation or unique landscape features.
Key routes	Streets or roads that have strategic importance.
Link Road	Names Houlton Way, providing a strategic connection from Clifton upon Dunsmore to the CPS and the wider SUE.
Non-active frontage	Building frontages where less than 80% of the ground floor building frontage is aligned with shop frontages, office lobbies and communal entrances to residential buildings.
Normandy Hill	Existing hill and area of public open space within the SUE, located south west of KP4.
Overlooking	A term used to describe the effect when a development or building have views over adjoining land or property, often causing loss of privacy.

Parameter Plan	The Parameter Plans form part of the Outline Planning Application and provide the parameters for future reserved matters applications. The Parameter Plans identify those elements of the scheme which are to be fixed as part of the planning permission (i.e. vehicular access into the site from the local highway network) and those elements subject to parameters.
Pedestrian Routes	In addition to primary, secondary and tertiary routes, pedestrian routes will be provided within the Key Phase. These are routes with pedestrian priority and servicing will be limited to off peak periods.
Permeability	The extent to which urban forms permit (or restrict) movement of people or vehicles in different directions.
Play space / Pocket Park	Space within public realm dedicated to play. These areas are likely to include some provision of landscape enhancements for play or play equipment.
Primary Roads	Primary roads are identified on the Parameter Plan. These routes will be the principal means of servicing the development.
Public Open Space	Those areas where access for the public is secured irrespective of ownership. It does not include areas of water, private residential gardens or incidental areas, such as road verges, or streets (unless these form part of a link in the open space network).
Private Open Space	Private open spaces, individual or shared.
RBC	Rugby Borough Council.
Regulatory Plan	The Regulatory Plan forms part of the KP4 documentation and identifies those elements of the scheme which are to be fixed as part of the planning permission and those elements subject to further Reserved Matters applications.
Reserved Matters	Future detailed applications to be submitted under reserved matters pursuant to the Outline Planning Application
Ridge and Furrow	Archaeological patterns of ridges and troughs created by a system of ploughing used during the middle ages.
Tertiary / Secondary Streets	Streets connected to primary streets or other tertiary streets. These often provide access to housing within development parcels.
SPD	Supplementary Planning Document.
St Gabriels	St Gabriels is the Primary School located in KP1 and opened in September 2018.
SuDS	Sustainable drainage systems (SuDS) are drainage solutions that provide an alternative to the direct channelling of surface water through networks of pipes and sewers to nearby watercourses.
SUE	Sustainable Urban Extension.
OPA	Outline Planning Application.
WCC	Warwickshire County Council.
Wildlife Corridors	Areas of public open space to provide sustainable connections between KP4 and the wider SUE. These corridors also have an ecological and drainage function for SuDS. Wildlife Corridors are typically 20m or 60m in width.

Appendix A6

Sustainability Statement

Houlton, Rugby – KP4 Design Guide. Sustainability guidance.

Purpose of this document.

This note has been produced by Hoare Lea, on behalf of Urban & Civic, to feed into the KP4 Design Guide for the Houlton masterplan in Rugby. The guidance provided in this document is intended to be used, as appropriate, within Section 5.19 – Sustainability Principles of the Design Guide being developed by David Locke Associates.

The proposed chapter presented in this document has used the same section headings as those currently shown within the draft guide and incorporated the content discussed in the workshop hosted by Hoare Lea with Urban & Civic and David Locke Associates on 24th November 2021.

Section 5.19 – Sustainable Building Design.

Dwelling specification.

This section of the guide has been split into six categories to ensure a holistic approach to sustainable building design is achieved:

1. Solar orientation and building form
2. Energy
3. Water
4. Waste
5. Overheating
6. Materials

In order to ensure sustainable building design is achieved in practice, the following design specification targets have been set for the developer(s) to follow. For each target, where appropriate, tiers of performance are available to offer a level of design flexibility. In some cases, there will only be one tier of performance proposed:

- Baseline: It is expected that all baseline targets will be achieved as good practice of sustainable building design.
- Improved: These targets are based on anticipated changes to upcoming regulations to ensure the development is 'future proofed'.
- Innovation: These targets are based on industry recognised guidance (i.e. RIBA, LETI, etc.) indicating what is required to meet zero carbon status by 2030.

1. Solar orientation and building form.

1.1 Orientation and considerations for glazing ratio.

The location, orientation and size of glazing can have a significant impact on energy demand and thermal comfort of a dwelling. Figure 1 gives an overview of the advised glazing ratios (i.e. proportion of glazed area to façade area) for the various orientations.

There needs to be a balance between the benefits of solar gains, namely the warmth from the sun that comes into the room throughout the day, and the heat losses that occur through the resultant fabric performance.

When considering heat losses, the fabric performance (i.e. U-value) of glazing tends to be much lower than a wall due the types of materials used. For instance, a traditional wall has brick or block, insultation and plasterboards, etc. whereas windows have just two or three panes of glass separated by argon or air cavities. Therefore, where a surface has a higher proportion glazing compared to wall, the average performance will be lower and greater heat loss can occur.

Solar gains provide "free" heat during the day as warmth is emitted from the sun. South facing facades receive this benefit throughout the day as the sun tracks from East to West. So, where this is possible, increased glazing proportion can be beneficial, as the increased solar gains decrease the need for space heating.

However, it is important to consider risk of overheating when designing for higher glazing proportions. If excessive solar gains occur through large openings and a mitigation strategy has not be implemented within the design (e.g. mechanical or natural purge ventilation), the room/space can become too warm and incur discomfort and in extreme cases health problems. See the Overheating section for more guidance on overheating risk assessments and mitigation measures.

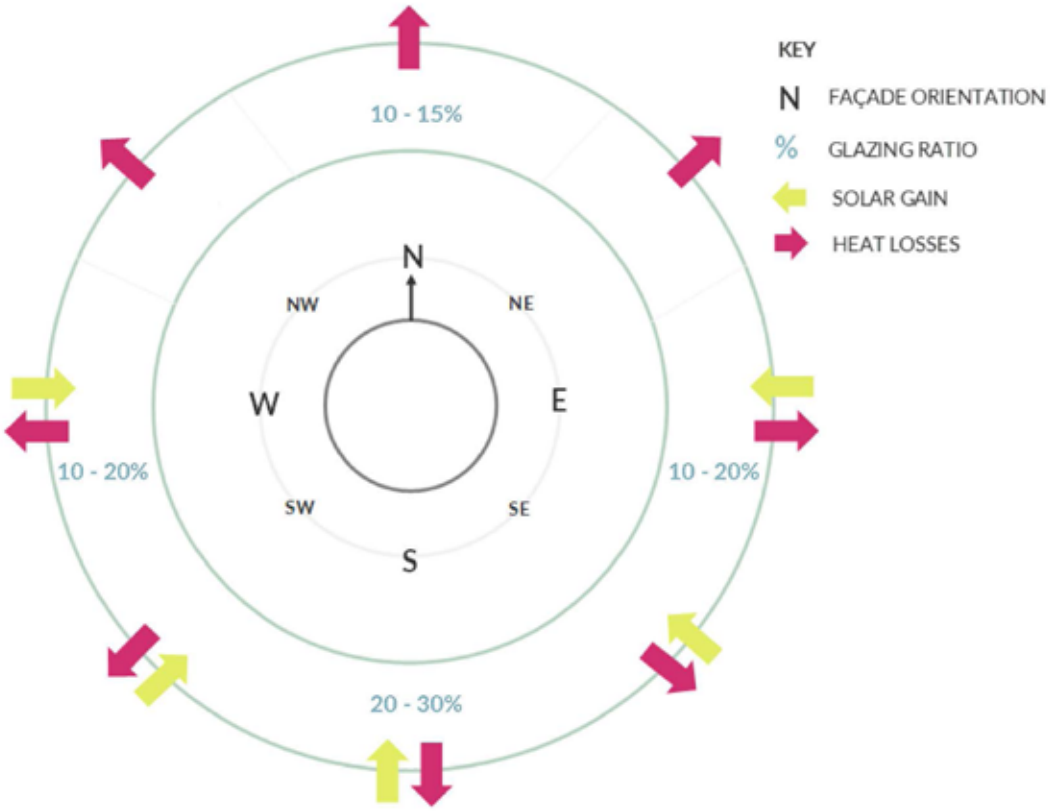


Figure 1: Recommended glazing ratios and orientation/location.

1.2 Window configuration and daylighting.

A misconception that often occurs, is that lower glazing proportions will result in poor daylighting levels. This can be avoided when considering window positioning and configuration.

Figure 2 shows the impact on three window configurations that have the same area and their resultant daylight factor. We can see that the scenarios that adopt a vertical configuration provide the worst daylighting across the room's floor plate, often concentrating on the space immediately in front of the opening. Whereas the option which uses a horizontal configuration provides the best average daylight levels, with the light spreading further into and across the room.

When considering impact on daylighting, a window will provide insignificant additional benefits where the sill is lower than 700mm above the floor level. Therefore, it is advised that, unless an opening consists of a door such as French or Balcony doors, windows should be designed to allow for horizontal configuration as an optimum.

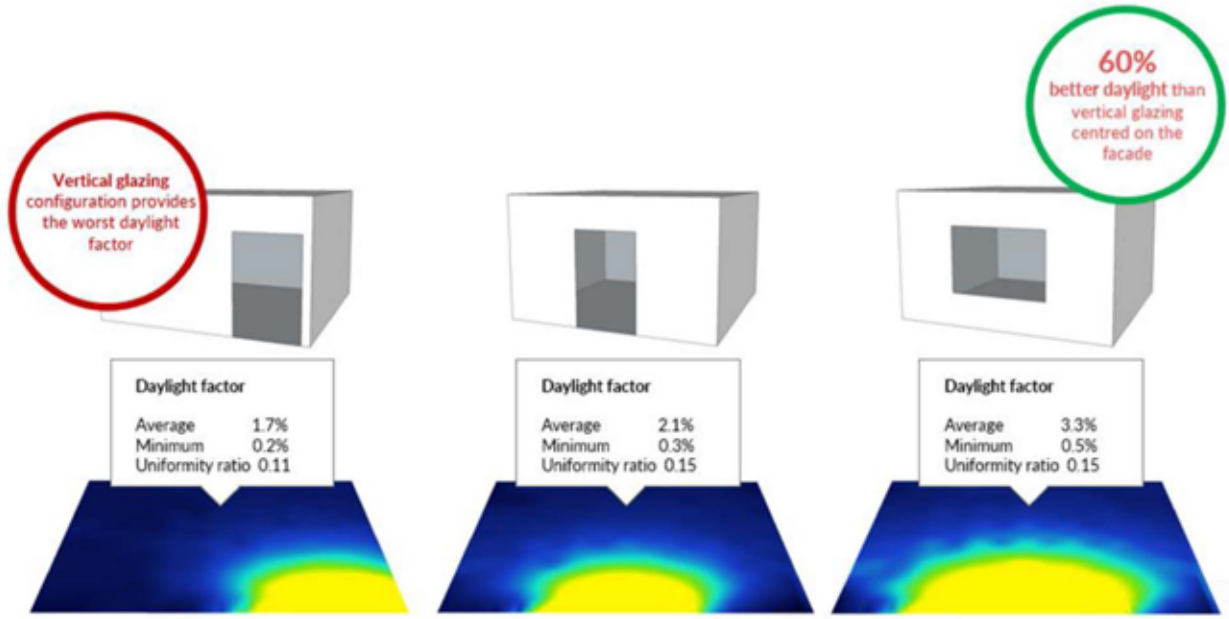


Figure 2: Window configuration and impact on daylighting.

1.3 Façade efficiency.

The shape and form of a dwelling can have significant impact on energy demand in operation.

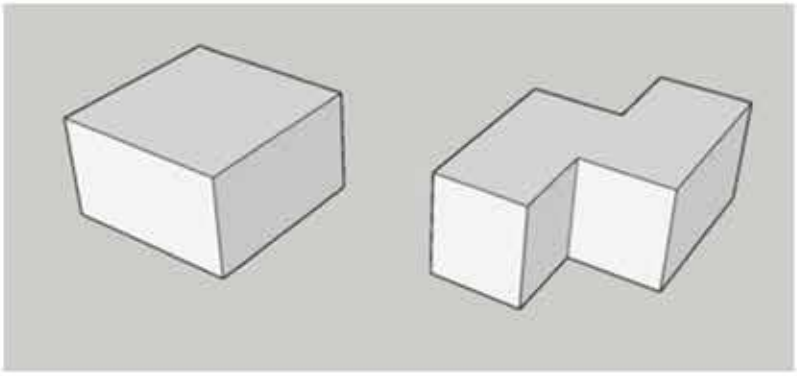
Form factor is defined as the ratio of the total heat loss area compared to the net internal floor area of a dwelling or building. Figure 3 provides as overview of indicative form factors of typical dwelling types.

The form factor will also increase where the shape of a dwelling or building is considered irregular, which can increase the heat loss area of the façade. This can be seen where a shape of the same volume has a higher external wall or heat loss area caused by the irregularity of the shape.

A higher form factor will result in higher heat loss potential which requires increased fabric performance to mitigate additional potential demand.

	Type	Form Factor	Efficiency
	End mid-floor apartment	0.8	Most efficient
	Mid-terrace house	1.7	
	Semi-detached house	2.1	
	Detached house	2.5	
	Bungalow	3.0	Least efficient

Figure 3: Form factor associates with typical dwelling types.



Volume: 600m³ **Volume: 600m³**

External Wall Area: 240m² **External Wall Area: 300m²**

Increase of 20%, therefore increase in heat loss

Figure 4: Example of impact from form factor.

Table 1: Solar orientation and building form targets.

1. Solar orientation and building form	Baseline criteria	
	Target form factor	Achieved?
1.1 Glazing ratios	North orientated façade glazing ratio 10-15%	☐
	South orientated façade glazing ratio 20-30%	☐
	East or West orientated façade glazing ratio 10-20%	☐
1.2 Form factor	Mid terrace: <1.7	☐
	End of terrace / Semi-detached: <2.1	☐
	Detached: <2.5	☐
1.3 Glazing height	Windows/openings do not have sill height <700mm unless openable door (e.g. French doors)	☐

2. Energy.

2.1 Fabric performance.

The specification of U-values and air permeability (i.e. how leaky the dwelling is) impacts the resultant heat loss potential of a façade and will result in either an increase or decrease in space heating demand and utility bills.

Traditionally, design has been driven by Building Regulations for legal compliance. The current adopted version of these regulations that relates to sustainable building design is Part L 2013. However, this is due to be updated for adoption in June 2022 with a further update in 2025 in the form of the Future Homes Standard.

To move towards a 'performance' rather than 'compliance' led design that is future proofed for emerging changes to policy and regulation and considers the Climate Emergency, the London Energy Transformation Initiative (LETI) produced the LETI Climate Emergency Design Guide in 2020 to "support the transition of the built environment to net zero carbon...".

2.2 Energy use intensity (EUI).

In order to move towards a performance led design, it is proposed that energy use intensities be used for target values rather than the traditional improvement in carbon emissions over the Part L baseline. The reasoning for this relates to the carbon intensity of the grid as it continues to decarbonise following the investment in renewable technologies.

Part L sets agreed carbon factors for all fuel types when it is adopted. However, as it is not updated regularly, these figures quickly become outdated and stop providing a realistic picture of a development's environmental impact. Whereas the predicted energy demand is less likely to have as much of a variance in practice and can be more easily measured and monitored during operation through the use of smart meters.

The other reason why EUI's are considered a more robust form of performance is that it considers total demand, i.e. regulated and unregulated energy uses, whereas Part L considers regulated emissions only.

Regulated energy demand: Energy consumed by a dwelling or building associated with fixed installation for heating, hot water, cooling, ventilation and lighting systems.

Unregulated energy demand: Energy consumed by a building that is outside of the scope of "regulated", e.g. energy associated with white goods, TVs, computers and plug in equipment.

Within the LETI Climate Emergency Design Guide and the RIBA 2030 Climate Challenge documents, a series of targets have been identified for EUIs should net zero carbon status be sought. Within this, specific targets are also set for space heating demand as these, historically, contribute to the majority of regulated energy demands.

2.3 The energy hierarchy and renewable energy.

When developing the energy strategy for the development, the Energy Hierarchy should be followed to adopt a "fabric first" approach to design. A definition of each stage of the hierarchy is available below.

- Be Lean: Use less energy and manage demand during operation through fabric and servicing improvements and the incorporation of flexibility measures.
- Be Clean: Exploit local energy resources (such as secondary heat) and supply energy efficiently and cleanly by connecting to district heating networks.
- Be Green: Maximise opportunities for renewable energy by producing, storing and using renewable energy on-site.

Figure 5: The energy hierarchy.

Renewable energy

There are a number of technologies now considered as Low or Zero Carbon (LZC) that can be included within the energy strategy to further reduce or offset energy demand and carbon emissions. However, not all technologies will be appropriate for a development and should be considered during the design development. The following technologies should be considered as a minimum for the KP4 phase of the masterplan, as part of an LZC feasibility study:

- Heat pumps
  - Air source heat pumps (ASHP): ASHP work to extract heat from the air at efficiencies much higher than can be achieved by electric panel heaters (i.e. greater than 100%). This improved efficiency of heat generation – typically >250% - significantly reduces the energy consumption to heat a building, reducing bills and carbon emissions while also minimising impact on local grid resilience.
  - Ground source heat pumps (GSHP): GSHP work to extract heat from the ground. As more heat is stored in the ground compared to the air, the efficiencies of GSHP tend to be greater than that of ASHP. However, GSHP require a form of excavation as part of the installation. There are two methods of extraction: vertical, which requires piles or boreholes to be dug to extract heat from lower ground depths, or horizontal, which requires pipes to be installed at a shallower depth but over a greater surface area. Ground investigation works would be required for GSHP to determine the suitability of the technology.
  - Water source heat pumps (WSHP): WSHP work to extract heat from water sources. This type of heat pump has the potential to perform with the highest efficiency of the three heat pump types. However, the technology requires proximity to a body of water to be installed. Furthermore, as WSHP extract heat from water sources, it can result in a change in water temperatures which can impact local ecology. Therefore, liaison with an ecologist and the Environment Agency may be required should this technology be sought for installation.
- Solar technology
  - Photovoltaic (PV) panels: PV panels convert solar irradiance into electrical energy which can be used on site or sold back to the National Grid. PV panels are most efficient if orientated to face south to optimise the available solar levels throughout the day and tilted to 30° to enable self-cleaning keeping the panel efficiency optimised. PV panels tend to be located on roofs to avoid risk of overshading further increasing potentially efficiency.
  - Solar thermal panels: Solar thermal can be used to provide a proportion of the domestic hot water demand of the dwelling or building. As domestic hot water demand tends to be one of the most

significant uses for a dwelling, this can provide a significant saving in energy use. However, as domestic hot water is not used continually throughout the day like electrical demands, thermal panels require a store for the solar heated water to be held until it is needed. As the stored hot water is kept at a higher temperature, less energy is then required to get it up to the required temperature for use.

Additional technologies that could be considered are:

- Wind energy (i.e. turbines)
- Small scale hydro technologies – require proximity to flowing water source, e.g. rivers or streams.

Table 2: Energy checklist targets.

2. Energy		Baseline target	Improved target	Innovation target
2.1 Fabric performance	Roof U-value ($W/m^2.K$)	0.11-0.16 ☐	0.10-0.12 ☐	<0.15 ☐
	Wall U-value ($W/m^2.K$)	0.18-0.26 ☐	0.13-0.15 ☐	<0.15 ☐
	Floor U-value ($W/m^2.K$)	0.13-0.18 ☐	0.08-0.10 ☐	<0.15 ☐
	Window U-value ($W/m^2.K$)	1.20-1.60 ☐	1.20-0.80 ☐	<0.85 ☐
	Air permeability	<3 $m^3/m^2.hr$ @50Pa ☐	<1 $m^3/m^2.hr$ @50Pa ☐	0.6 ACH @50Pa ☐
	Thermal bridging	y=0.05 ☐	y=0.04 ☐	All linear thermal bridges have psi value of <0.01 W/mK ☐
2.2 Energy use intensity	Total energy use intensity ($kWh/m^2/yr.$)	<120 $kWh/m^2/yr.$ ☐	<60 $kWh/m^2/yr.$ ☐	<35 $kWh/m^2/yr.$ ☐
	Space heating energy use intensity ($kWh/m^2/yr.$)	<50 $kWh/m^2/yr.$ ☐	<25 $kWh/m^2/yr.$ ☐	<15 $kWh/m^2/yr.$ ☐
2.3 Energy strategy	-	All energy demands met from electric sources (i.e. no combustion on site) and at least one LZC technology included within the strategy. ☐	ASHP used for all thermal demand and PV installed. ☐	ASHP used for all thermal demand and PV installed as well as an additional LZC technology ☐
2.4 Ongoing monitoring		Smart meters installed ☐	Smart meters installed which can report on end uses separately (e.g. space heating, hot water, lighting, etc.) ☐	

3. Water.

3.1 Within the dwelling.

Specification of water consuming fittings

Potable water is drinking water and the consumption considers all fittings that use this water type, e.g. taps, washing machines, showers and toilets.

The specification of low consumption fittings can significantly reduce potable water demand and reduce potential environmental impact. Table 3 below provides examples of the consumption rates that would be needed to achieve a consumption rate of 110 and 100 litres/person/day (in accordance with Approved Part G methodology of Building Regulations).

Table 3: Target water consumption specifications (source Home Quality Mark).

Fitting	To achieve 110 litres/person/day	To achieve 100 litres/person/day
WCs (litres per flush)	<4/2.6 (dual flush)	<4/2 (dual flush) (maximum 3 litres effective flushing volume)
Showers (litres/minute)	<8	<6
Baths (litres)	<170	<170
Basin taps (litres/minute)	<5	<5
Kitchen sink taps (litres/minute)	<6	<6
Dishwasher (litres/place setting)	<1.25	<1.25
Washing machines and washer dryers (litres/kg load)	<8.17	<8.17

Rainwater and grey water recycling

To target lower consumption rates (i.e. the Improved and Innovation targets within the checklist), rainwater harvesting and greywater recycling would need to be considered to offset the potable water demand.

Rainwater harvesting: Rainwater is collected and stored to provide the water demand for fittings that do not require water to be drinking safe, e.g. WC flushing. This would require an internal store, e.g. within roof space, and then fed to the relevant fitting.

Greywater recycling: Wastewater from fittings such as showers, is collected and used to flush WCs. This requires specific systems to be installed to connect the two fittings which would need to be considered within the bathroom design.

3.2 Outside the dwelling.

Water use is also present for gardening and car washing which uses potable water from external taps or filled up from the kitchen/utility cupboards. As water demand for external uses is not required to be 'potable', it can be met via rainwater harvesting.

Water butts are commonly used as a method to reduce potable water demand for external uses such as gardening and irrigation. The water butts are connected to the dwelling gutters to collect rainwater and stored until needed. Should this method also be sought for other uses such as car washing, which require a higher volume of water, this should be considered when sizing the butt.

Landscaping design can also consider potable water free systems, such as gulley's and pipes which are fed from the rainwater store to irrigate large areas of land and controlled via a tap or other shut off valve.

Table 4: Water checklist targets.

3. Water	Baseline target	Improved target	Innovation target
3.1 Potable water	<110 litres/person/day ☐	<95 litres/person/day ☐	<75 litres/person/day ☐
3.2 Non-potable water	Rainwater collection stores installed ☐	Alternative rainwater irrigation systems installed ☐	

4. Waste.

4.1 The circular economy approach.

The construction and operation of the built environment consumes 60% of all materials in the UK. At end of life, materials are often diverted from landfill but are down cycled which reduces their value and ability to be recycled or reused.

The circular economy approach seeks to retain value of materials throughout all processes to irradicate waste consumption in total. The circular economy has three main principles:

1. Conserve resources: Minimise quantities of materials used and other resources (e.g. energy, water, etc.)
2. Eliminate waste: design for longevity, adaptability or flexibility, reusability and recoverability and design out construction, demolition, excavation and operational waste.
3. Manage waste at all stages, from cradle to grave.

When developing a waste strategy in line with the Circular Economy Approach, the decision tree as shown in Figure 6 can be used as a tool.

4.2 Construction waste.

Reducing the amount of waste produced lowers the environmental impact and the cost of the construction process. The true cost of waste includes the cost of the product or material that is wasted as well as the cost of handling and managing the waste. Although there may be income associated with recycling certain materials, construction sites usually have to pay to have waste collected or processed.

Legislation in this area has changed over time. However, the benefits to the developer and the environment remain the same.

Site Waste Management Plans prepared and submitted pursuant to RMAs in KP4 should set targets for demolition, construction and excavation waste resulting from the proposed development. By setting these targets, it promotes resource efficiency and effective waste management during this stage of the development in line with the circular economy approach.

Targets have been set for Baseline, Improved, and Innovation within the checklist following guidance set by the Home Quality Mark.

4.3 Operational waste.

The ability to impact waste management during operation, i.e. when the dwelling is occupied, is limited as each household and their associated behaviours will differ. However, by making good practice behaviours the easier option, it is more likely to be adopted.

By providing dedicated internal and external waste storage (which may be provided by the council) such as separate bins for municipal, recyclable and food/green waste, the occupant will be prompted to separate and manage their waste more effectively. Sizing of internal bins should consider the frequency of bin collections to ensure good behaviour is maintained. For example, if a recycling bin is too small for frequency of collections, occupants will likely put recyclable waste in the general waste bin to avoid mess within their home.

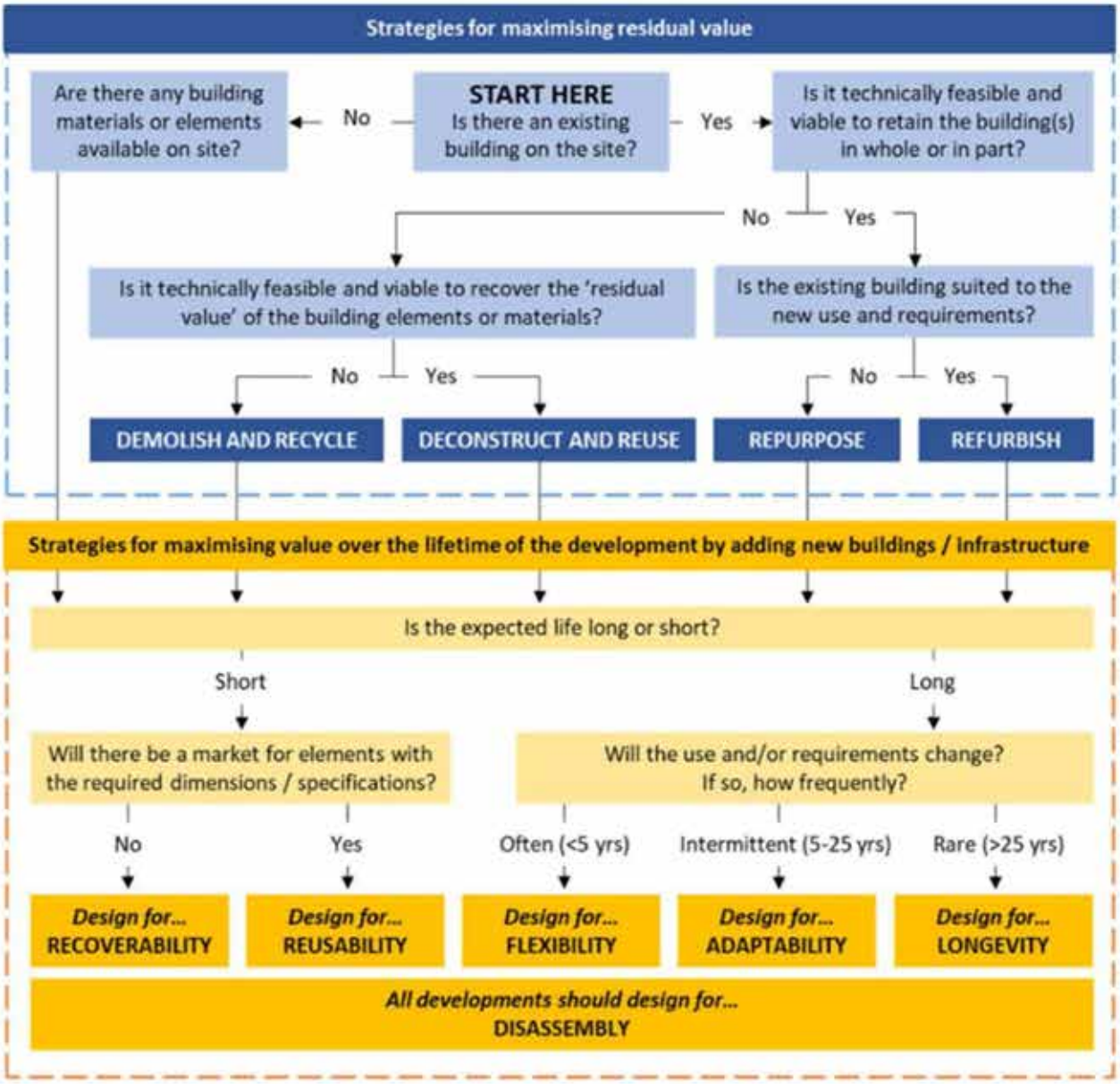


Figure 6: Circular Economy Decision Tree (source: Greater London Authority).

Table 5: Waste checklist targets.

4. Waste		Baseline target	Improved target	Innovation target
4.1 Circular economy		Waste strategy produced in accordance with circular economy approach ☐		
4.2 Construction waste	Waste generated	<8.5 tonnes/100m^2 ☐	<4.9 tonnes/100m^2 ☐	<1.9 tonnes/100m^2 ☐
4.3 Diversion from landfill	Construction waste	>80% ☐	>90% ☐	100% ☐
	Demolition waste	>90% ☐	>95% ☐	100% ☐
	Excavation waste	-	>95% ☐	100% ☐
4.4 Operational waste		Internal waste storage provided for general, recyclable and food waste separately		

5. Overheating.

As discussed in Section 1 – Solar orientation and building form, a balance needs to be achieved between benefits of solar gains and minimising heat losses which avoiding risk of overheating.

As fabric performance increases and facades become more airtight, heat gains that are present within a room can be harder to remove through traditional means. Furthermore, an impact of climate change that has already been experienced in recent years is increased external temperatures in summer months and likelihood of heat waves. This is only likely to increase year on year if the climate emergency is not recognised and acted on. The result of this means that purge ventilation through opening of windows becomes less effective as the external temperature is higher than the internal or operative temperatures so the opening of windows introduces additional heat gains.

5.1 Criterion 3 of Part L.

Criterion 3 of Approved Part L of Building Regulation assesses the limitation of excessive solar gains, which can be considered a form of overheating risk assessment. However, the calculation that assess this criterion as very simple and only considers fabric performance (i.e. U-values and air permeability), glazing ratio and orientation. As a result, it does not consider internal gains that come from equipment such as fridge and freezers, lighting and the occupants themselves. Furthermore, it does not consider typical behaviour profiles in regard to room uses, i.e. living rooms will likely be used more during the day compared to bedrooms. Therefore, it is not advised that Criterion 3 is used to assess overheating risk of a dwelling in isolation.

5.2 CIBSE TM59 assessment method.

CIBSE TM59: Design methodology assessment for overheating risk in homes (2017), offers an industry recognised approach to assessing overheating risk using a dynamic model.

The following criteria is available, dependant on the ventilation strategy:

- Adaptive criteria - Homes that are predominantly naturally ventilated
  - Living rooms, kitchens and bedrooms: The number of hours during which deltaT is greater than or equal to 1°K during the period May-September inclusive shall not be more than 3% of occupied hours.
  - Bedrooms only: To guarantee comfort during the sleeping hours, the operative temperature in the bedroom from 22:00-07:00 shall not exceed 26°C for more than 1% of annual hours.

- Fixed criteria – Homes that are predominantly mechanically ventilated
  - Living rooms, kitchens and bedrooms: Occupied rooms should not exceed an operative temperature of 26°C for more than 3% of the annual occupied annual hours.

5.3 Consideration for future climate impacts.

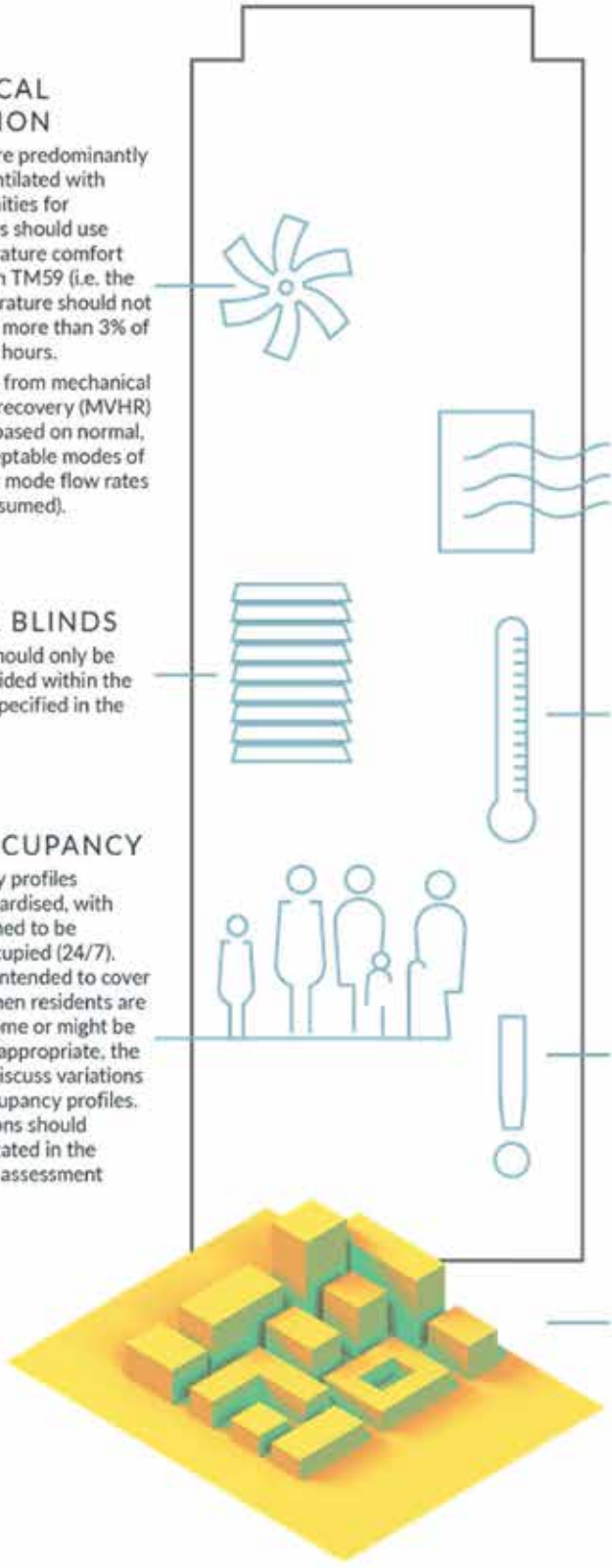
Within the dynamic modelling assessment of TM59, the weather files can be set for three available data sets for 2020, 2050 and 2080 to consider potential future climates.

To ensure the development can be considered adaptable to climate change or climate change resilient, it is advised that the assessment is carried out to determine levels of overheating risk for the future climates to identify where mitigation measures may be required, e.g. cooling. This could inform the ventilation strategy to ensure the approach can be adapted as needed if the measures are not incorporated from day one.

Table 6: Overheating checklist targets.

5. Overheating	Baseline target	Improved target	Innovation target
5.1 Overheating risk assessment	An overheating risk assessment has been carried out in accordance with CIBSE TM59 ☒		
5.2 Climate change resilient	Meets relevant CIBSE TM59 criteria for 2020 climate conditions ☐	Meets relevant CIBSE TM59 criteria for 2050 climate conditions ☐	Meets relevant CIBSE TM59 criteria for 2080 climate conditions ☐

Key aspects of overheating assessment methodology.



MECHANICAL VENTILATION

Dwellings that are predominantly mechanically ventilated with limited opportunities for opening windows should use the fixed temperature comfort limits specified in TM59 (i.e. the operative temperature should not exceed 26°C for more than 3% of annual occupied hours.

Ventilation rates from mechanical ventilation heat recovery (MVHR) units should be based on normal, acoustically acceptable modes of operation (boost mode flow rates should not be assumed).

INTERNAL BLINDS

Internal blinds should only be modelled if provided within the base-build and specified in the contract.

ROOM OCCUPANCY

Room occupancy profiles have been standardised, with bedrooms assumed to be permanently occupied (24/7). This scenario is intended to cover the condition when residents are working from home or might be house bound. If appropriate, the designer could discuss variations to proposed occupancy profiles. These assumptions should be agreed and stated in the overheating risk assessment report.

WEATHER FILES

Weather files to be used in the simulation are the Design Summer Year (DSY01) adapted for future weather (2020s High emissions 50% scenario).

NATURAL VENTILATION

Dwellings that are predominantly naturally ventilated can use the adaptive comfort conditions specified in TM59. These are less onerous than the fixed temperature comfort test.

HEAT GAIN

Heat gains from communal heating systems and the potential impact on corridors overheating should be taken into account in the risk assessment.

IDENTIFY HIGH RISK

All high risk dwellings should be identified in a development. Typical risk factors include single aspect building forms, highly glazed areas, top floor units and locations that restrict full window openings due to noise or air quality constraints.

THERMAL MODELLING

CIBSE TM59 consolidates other CIBSE guidance relating to thermal comfort in homes, in particular the thermal comfort elements of CIBSE Guide A and CIBSE TM52, and provides a summary of how homes should be assessed using dynamic thermal modelling.

Figure 7: Key aspects of overheating assessment methodology.

6. Materials.

6.1 Sustainable procurement.

Sustainable procurement considers the supply chains of the materials needed to construct the development. This includes how materials are processed, how waste is managed, environmental standards of the processes, and locality of materials from site.

By setting a sustainable procurement policy within early stages of design, it will steer material specification as well as create a process of validation during construction to ensure environmental impact is minimised where feasible.

6.2 Responsible sourcing of materials.

Manufacturing construction products typically involves a long and complex supply chain that results in a wide range of impacts. These may be environmental (such as toxicity or biodiversity), economic (such as corruption, for example buying or selling of wood from protected forests) or social (such as slave labour or inequality) or issues that affect all three, such as climate change. The complete supply chain of construction products may extend to areas of the world where it is difficult to track. Responsible sourcing certification schemes (RSCS) provide a robust report on the impact of construction products. If products are covered by a credible RSCS, consumers and those involved in designing and constructing a home can be confident that risks have been avoided or minimised.

Examples of responsible sourcing accreditation that can be included within the specification of materials include ISO14001 and BES 6001. These certification options for the supply chain ensure that sustainable and responsible sourced materials can be achieved in practice.

6.3 Embodied carbon.

'Up front' emissions are those embodied emissions resulting from building construction, up to and including practical completion. This includes emissions associated with the extraction and processing of materials for building elements and the energy and water consumption in the production, assembly, and construction of a building, i.e. site construction activities.

It is possible that by day one of the building operation ~50% of life cycle emissions (including those associated with operational energy) may have been incurred. To that end, quantifying, disclosing, and reducing embodied carbon is becoming increasingly significant for the built environment. In fact, as operational emissions reduce, the proportion of a building's whole life carbon associated with the upfront embodied impact will increase.

Embodied carbon can however extend beyond 'up front' emissions and include carbon impacts from the 'in-use' phase of a building, i.e. the replacement, repair, refurbishment and maintenance of products during its life in / on the building as well as emissions associated with 'end of life' stages (demolition, dis-assembly and disposal of any parts of products or buildings).

As a response to mainstream scientific consensus on the urgent need to reduce carbon emissions, the UK Government has legislated to achieve Net Zero carbon by 2050. As part of the definition of Net Zero, the UK Green Building Council (UKGBC) have developed a framework for achieving Net Zero and defines the concept (within the construction phase) as:

"When the amount of carbon emissions associated with a building's product and construction stages up to practical completion is zero or negative, through the use of offsets or the net export of on-site renewable energy".

Figure 8 contextualises the scope of the UKGBC Net Zero carbon – construction within the context of the life cycle modules of a building, that is modules A1 to A5 of the building life cycle:

- A1-A3: Product Stage
- A4 and A5: Construction process stage.

Work to improve the consistency around the implementation of whole life carbon assessment and to boost credibility and uptake across the built environment is now well established (International Energy Agency (2016), Energy-Efficient Building European Initiative (2012), BCO (2012), etc.), including the RICS guidance note

"Methodology to calculate embodied carbon" (2014). The latter provides high level guidance on whole life carbon management.

The guidance for reducing embodied carbon outlines by the UKGBC is to adhere to the following hierarchy:

- **Build nothing** – Challenge the root cause of the need, explore alternative approaches to achieve the desired outcomes.
- **Build less** – Maximise the use of existing assets; optimise asset operation and management to reduce the extent of new construction required.
- **Build clever** – Design in the use of low carbon materials; streamline deliver processes; minimise resource consumption.
- **Build efficiently** – Embrace new construction technologies and eliminate waste.

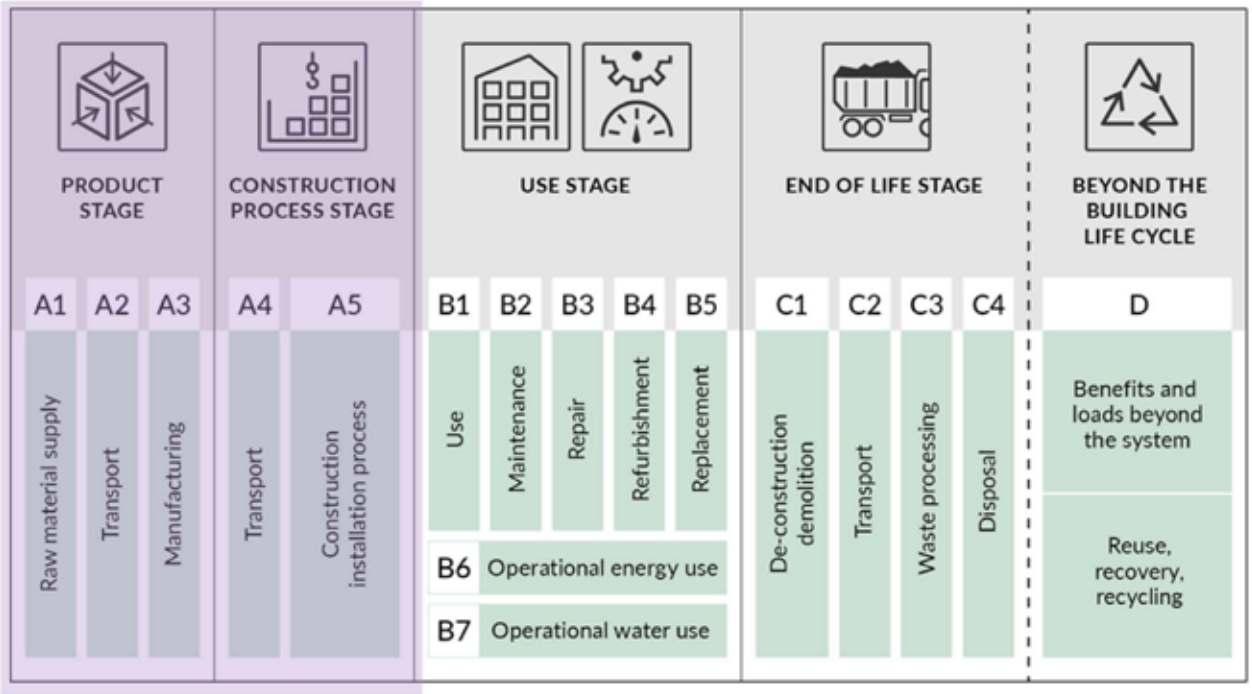


Figure 8: Building life cycle stages as determined by EN 15978.

Integration into the design process

Whilst embodied carbon assessments can be carried out at any stage of design and / or construction, it is recommended that in order to influence design decisions and achieve desired outcomes, we would recommend that embodied carbon is considered early in the design process.

- RIBA Stage 1/2 – Scoping, benchmarking and target setting. Establish "carbon budgets" for each building element (structure, envelope, services, finishes, etc) including consideration of the extent of refurbishment, retention and extension of the building.
- RIBA Stage 2 – Initial appraisal of concept design options, i.e. structural solutions and materials (steel, concrete, timber), façade cladding options (aluminium, steel, stone, etc), using example Environmental Product Declarations (EPDs) and benchmark data for raw materials where simpler.
- RIBA Stage 3 – Refined assessment of design proposals as structural, facade and MEP design develops, using cost plan to determine quantities in detail, based on aligned EPDs and raw material assessments where more representative.
- RIBA Stage 4 – Final design stage update based on detailed specifications.
- RIBA Stage 5 – Construction update based on "As Installed" materials.

Assessment method

To assess the embodied carbon for a development, a Life Cycle Assessment (LCA) tool – One Click LCA – should be used to establish the embodied carbon of each element, based on estimated or specified materials quantities for each element. These are represented within the model by selecting materials with associated Environmental Product Declarations (EPDs). EPDs are produced by manufacturers and identify the carbon emissions of a product. By selecting EPDs for all the materials proposed for the development, the overall carbon emissions can be approximated. It should be noted here that the LCA tool has a limited database of materials. In the scenario where a specified material isn't included in the database, the most similar material in terms of material composition is selected instead.

The carbon emissions attributable to the product stage [A1–A3] of the items included in the whole life carbon assessment must be calculated by assigning suitable embodied carbon factors to the given elemental material quantities.

[A1–A3] = Material quantity (a) × Material embodied carbon factor (b).

Modules [A4] and [A5] respectively capture the emissions associated with the transportation of the materials and components from the factory gate to the project site and their assembly into a building. Transport emissions must include all stages of the journey of the products following their departure from the final manufacturing plant to the project site, taking into account any interim stops at storage depots and/or distribution centres.

[A4] = Material or system mass (a) × transport distance (b) × carbon conversion factor (c)

Note: material or system mass should be obtained from acceptable sources and travel distances should be based on the distance between the manufacturing location and the project site and is subject to the anticipated supply chain route of each item. Default scenarios can be used where exact information is not available. Also, the Carbon conversion factor should be based on the selected mode of transport.

The carbon emissions arising from any on- or off-site construction-related activities must be considered in [A5]. This includes any energy consumption for site accommodation, plant use and the impacts associated with any waste generated through the construction process, its treatment and disposal. See RICS whole life carbon assessment document for details.

Understanding the challenge

As with energy demand reduction, it is important to understand where the significant emissions source from to create a focus point.

Figure 9 depicts and example of the breakdown of the source of embodied emissions for a typical development. From this we can see that embodied carbon from frame materials contribute the largest proportion of emissions, followed by internal walls and partitions and substructure.

Therefore, these areas of the building need to be considered in the first instance to achieve the greatest emission reductions.

Figure 10 show the potential variances of façade specification and build up on the resultant embodied carbon of that element. When considering the embodied or up-front carbon (i.e. modules A1-A3, A4 & A5), the variances are would be ~75 kgCO2/m2 with the majority of emissions coming from the Product Stage. However, when looking at whole life emissions, construction types that use rainscreen or curtain wall have a large proportion of emissions from Replacement (i.e. module B4). For this example, traditional hand laid brick construction shows the lowest whole life emissions.

Figure 11 shows the importance of the selection of EPDs. This example compares a number of products' EPD for glazing, whether it be double or triple glazed. The variance can be seen even with products from the same manufacturer.

Table 7: Overview of the Life Cycle Modules includes in the assessment for embodied carbon.

Module	Description
A1-A3 Construction materials	Raw material supply (A1) includes emissions generated when raw materials are taken from nature, transported to industrial units for processing and processed. Loss of raw material and energy are also taken into account. Transport impacts (A2) include exhaust emissions resulting from the transport of all raw materials from suppliers to the manufacturer's production plant as well as impacts of production of fuels. Production impacts (A3) cover the manufacturing of the production materials and fuels used by machines, as well as handling of waste formed in the production processes at the manufacturer's production plants until end-of-waste state
A4 Transportation to site	A4 includes exhaust emissions resulting from the transport of building products from manufacturer's production plant to building site as well as the environmental impacts of production of the used fuel.
A5 Construction / Installation process	A5 covers the exhaust emissions resulting from using energy during the site operations, the environmental impacts of production processes of fuel and energy and water as well as handling of waste until the end-of-waste state.

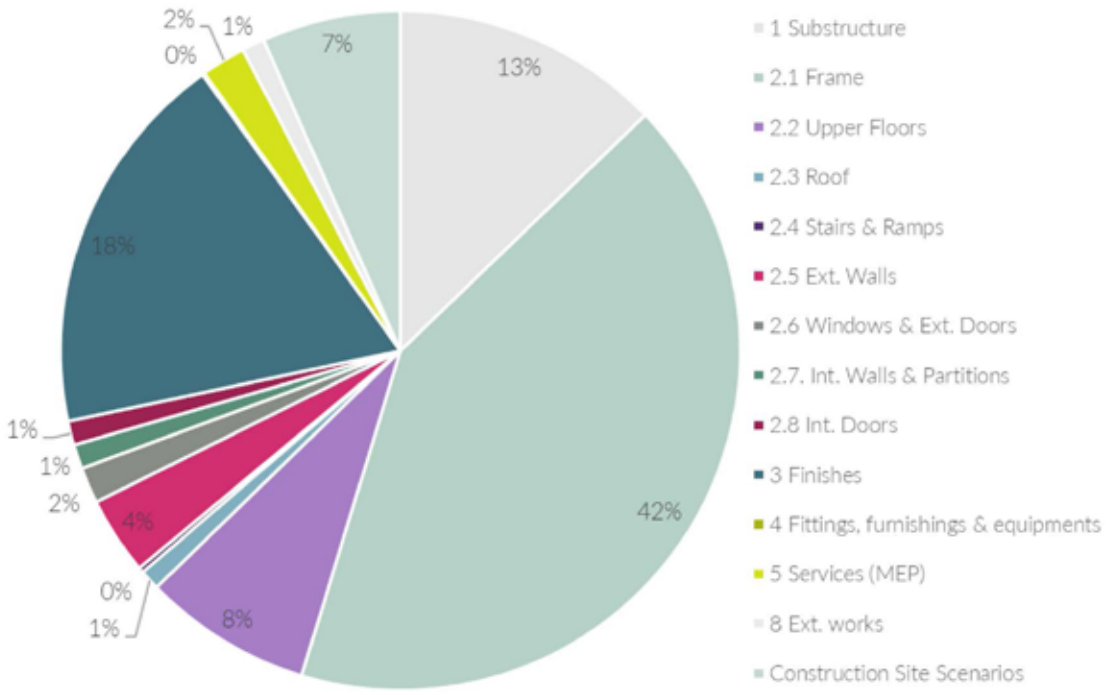


Figure 9: Example breakdown of calculated embodied carbon emissions.

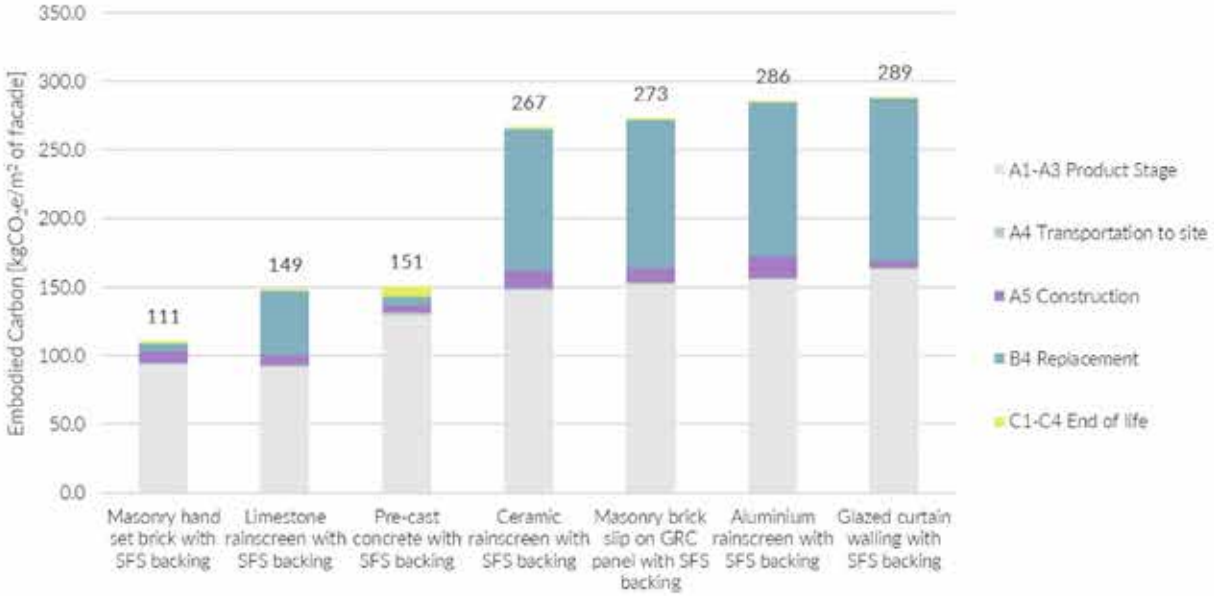


Figure 10: Façade construction types comparison.

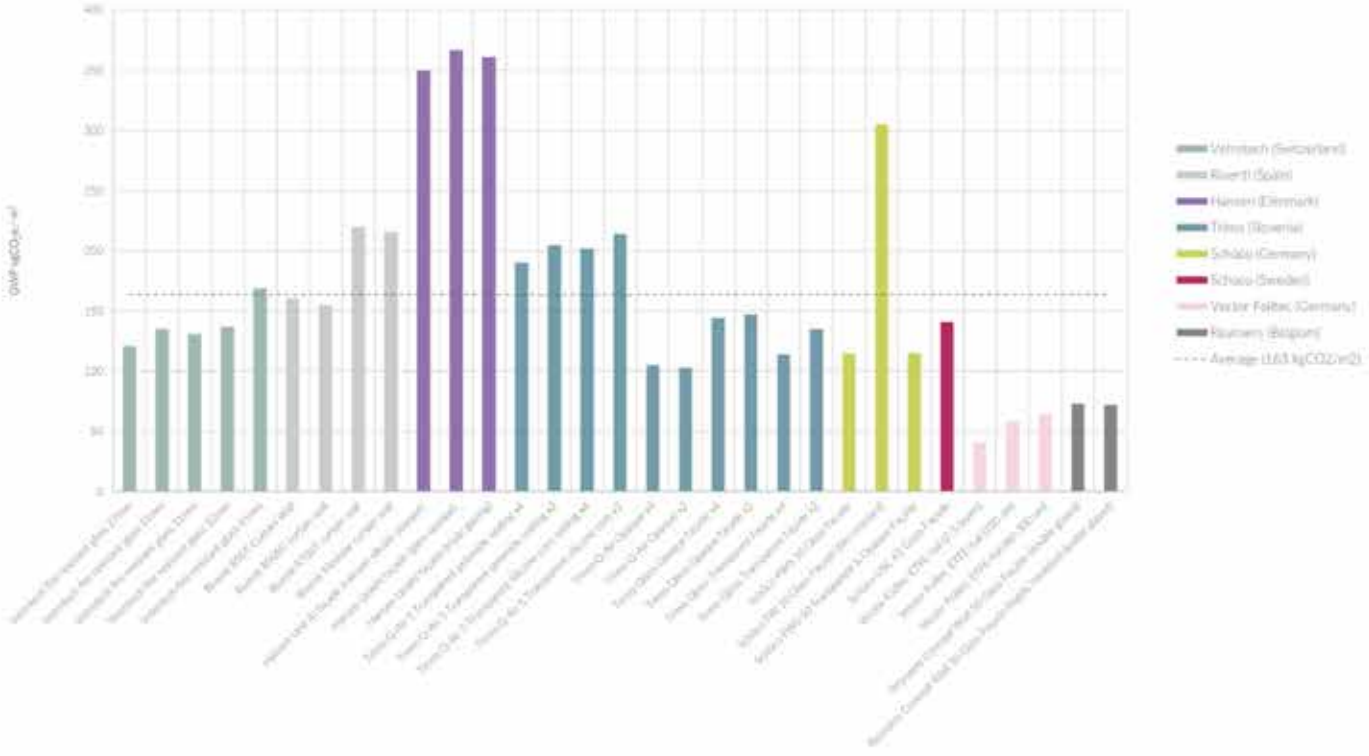


Figure 11: EDP comparisons - glazing.

Table 8: Materials checklist targets.

6. Materials		Baseline target	Improved target	Innovation target
6.1 Sustainable procurement		A sustainable procurement plan has been developed at RIBA stage 2 and included within the contractor requirements. ☐		
6.2 Responsible sourcing		All materials will be procured from a supplier that can demonstrate they hold either ISO 14001 or BES 6001 certification. ☐		
6.3 Embodied carbon	Up front emissions	<1,200 $kgCO_{2e}/m^2$ ☐	<800 $kgCO_{2e}/m^2$ ☐	<625 $kgCO_{2e}/m^2$ ☒