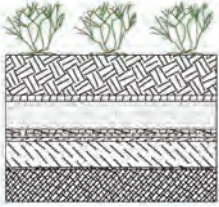

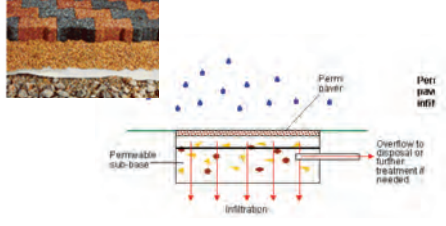
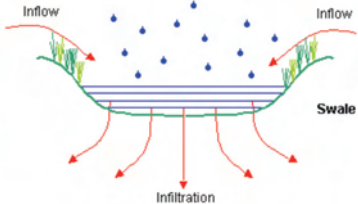

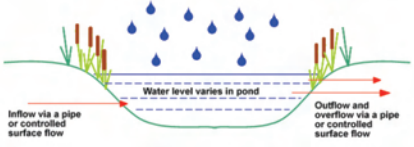


Table 3.12 Palette of potential SUDS Techniques.

Type	Description		Possible location
Water butts	Tanks for rainwater storage attached to roof downpipes which store water for re-use in the garden.		All residential dwellings.
Green roofs	A multi-layered surface covering the roof of a building on which plants can grow. The vegetated surface provides a degree of retention, attenuation and treatment of rainwater and promotes evapo-transpiration.		Apartment blocks, Commercial, Industrial Areas.
Rainwater harvesting	A rainwater collection system which gathers water from roofs and stores it for re-use for either irrigation or non-human use, ie. toilet flushing.		Optional for all built development
Overflow soakaways	Perforated ring or rubble soakaways for immediate groundwater recharge with overflows to land drainage or surface water sewerage system to cater for low infiltration rates or extreme events.		Roof drainage from domestic dwellings.
Permeable and porous surfaces / pavements	Paved surfaces which allow water to infiltrate through the material to the sub-strata, for example: grassed and gravel surfaces; porous concrete and asphalt; and permeable block paving.		Suitable for all private courtyards, and educational, commercial and employment, car parking areas and all highways except the construction access roads primary streets, spine road and perimeter road.
Swales and ditches	A shallow vegetated channel designed to conduct and retain water, but may also permit infiltration. The vegetation filters particular matter.		Suitable for development edge and perimeter road. Possibly some footpaths and cycleways. Often with French drain.
Filter drains / french drains	A French or filter drain connected into land drainage system incorporating perforated pipes with granular surround to optimise any available infiltration.		Where possible on avenues, boulevards, perimeter or remote roads, footpaths and cyclepaths. Also with swales.
Wetlands	A pond that has a high proportion of emergent vegetation in relation to open water. A shallow water depth feature with bio-diversity benefits.		Informal open space / country park
Detention basins / detention ponds	Predominantly taking the form of dry / wetland detention basin with wet area. Retention ponds are ponds where run-off is detained for a sufficient time to allow settlement and possibly biological treatment of some pollutants.		NE Ponds 1, 2 and SE Ponds 3, 4. Adjacent to outfalls to main rivers and watercourses

(Source: Construction Industry Research and Information Association (CIRIA) 2004 and <http://www.environment-agency.gov.uk>).

3.2 continued:

Infrastructure**Highway drainage**

Minor streets, mews, country lanes, private drives;

Other than the main access routes into parcels, priority shall be given to the use of porous paving systems with sub-base infiltration blankets on estate roads, mews courts and similar areas. The system should allow infiltration into the substrate however minimal and will not normally require lining other than:

- (i) preventing water entering the services zone under the footway.
- (ii) the installation of a vertical barrier to contain water within a defined storage zone.
- (iii) where the accumulation of water in close proximity to buildings may be detrimental to building foundations.

Where the subsoil has a low permeability the permeable sub-base layer will act as a storage zone with attenuated discharge to a highway drain (Estate Road Drainage). The infiltration blanket or Estate Road Drainage may also receive flows from the plot drainage.

Where there is a risk of pollution (eg. large parking courts) runoff must be routed through an appropriate interceptor prior to discharge to ground or other systems.

Secondary streets

Due to the higher traffic volumes along the main construction routes into parcels, these roads will be non-porous surfacing. Standard trapped gulley pots will collect runoff and discharge the flow into a permeable sub-base layer.

Balancing facilities

Surface water attenuation and detention facilities are being provided at the downstream end of the surface water system. These act as a fail safe backstop to the source controls. The discharge from the facility will not exceed the existing greenfield rates of runoff for the predevelopment catchments. Storage facilities are sized to accommodate the 100 year event plus an allowance for climate change. A reduction in overall volume has been applied to allow for the storage provided at source within the development parcels.

Catchment subdivisions & maintenance of catchment flows

A detailed drainage strategy has been approved for the whole site. It identifies the main highway drain runs and permitted rates of discharge at intervals along the network. For practical phasing reasons the site will be divided into development parcels. Most parcels fall within and drain to the natural catchment.

As a sheet runoff protection measure a cut off ditch will be provided along the north western boundary. This cut off ditch will be extended to meet the existing head of Whitelands Farm Ditch.

Priority should be given to the use of swales to serve development fronting the south western edge of the development. This will assist in maintaining flows to Whitelands Farm Ditch.

Construction phase requirements

To prevent flooding during construction the permanent or temporary attenuation systems must be provided prior to the commencement of works.

The efficacy of infiltration systems and SUDS in general can be severely reduced by siltation. If the SUDS are not installed prior to development then contractors must take precautions during the construction phase to protect the entire drainage system, including existing water courses from siltation or pollution.

Advice on good practice can be found in CIRIA Report C697 (2007) and THE SUDS MANUAL and C698 2007 Site Handbook for the construction of SUDS. Developers are advised to draw to the attention of their contractors Section 3, General construction issues associated with SUDS. It provides advice on cut-off drains, temporary siltation pits, catchpits and protection of permeable paving.

wApprovals

Developers must ensure that;

- **When submitting drainage details, the covering letter must refer to the relevant conditions being discharged.**
- **A summary document outlining the drainage proposals must be included.**
- **The development layouts shall not obstruct the overland flood flow routes. In particular linked buildings and terraces shall not block overland flood routes.**
- **Calculations must be included demonstrating compliance with this Code.**
- **A plan must be included identifying overland flood routes through the development parcel and connections to and from adjacent parcels.**
- The following shall be considered prior to commencing designs;
 - the SUDS techniques suitable for the respective development parcel.
 - who will be responsible for the future maintenance.
 - what commuted sums are applicable.
 - departures from the Design Code requirements if justified.
- The following should be consulted:
 - Oxfordshire County Council Highways
– tel: 01865 810463.
 - Environment Agency
– tel: 01491 828455.
 - Cherwell District Council –
tel: 01295 221828
re: planning issues.

The layout proposals shall be submitted to Oxfordshire CC Highways Section for Section 38 Approvals and to an approved body (eg. NHBC or Local Authority Building Control) for building control approval.

FOUL WATER DRAINAGE STRATEGY

For waste water disposal the site will be provided with a separate foul sewer network designed and constructed by the developers in accordance with the current edition of Sewers for Adoption. The onsite foul sewers will be adopted by Thames Water.

The site will have three main sub-catchments (north, south and central) which link together at the point where a new sewer constructed by Thames Water will cross under the A41 and lead to the Bicester WWTW. The proposed northern subcatchment sewer will be oversized and act as a relief sewer to the existing sewer along Middleton Stony Road.

The existing Middleton Stony Road sewer will then have capacity to accept flows from the two land parcels north of Pingle Brook and the Health Village parcel which abuts Pingle Brook and the A41.

The sewer network will be a gravity system and not require any onsite pumping stations.



Figure 3.13 Main foul water drainage routes.

3.2 continued:
Infrastructure

STREET NETWORK

The design of all streets should take account of current guidance within Manuals for Streets, 2007.

Kingsmere will be built using a street hierarchy that will assist navigation around the area as well as adding richness to the built environment. The legibility of the hierarchy requires clear distinctions between street types. This is provided principally by different dimensions and formats with variety within character areas through the variable use of landscape features, street parking and surface finishes.

The perimeter road, which provides a new strategic link between the A41 and Middleton Stoney Road, is not part of the hierarchy, but is shown below for clarity

The hierarchy of routes is fixed and comprises:

- **Primary Street**
- **Secondary Street**
- **Side Street**
- **Minor Street / Mews / Country Lane**
- **Private Drives**

There are, in addition, a series of dedicated pedestrian/cycle routes through and around Kingsmere.

Each street type has certain performance requirements as well as a particular role to play as part of the public realm. The following is a summary of their key (mandatory) dimensions and characteristics. Within each character area local variation of each street will be used to add support to the distinctiveness of that area, but within the limits set out below.

The Primary, Secondary and Side Streets will be designed for a maximum vehicle speed of 20mph.

Minor Streets / Mews / Country Lanes and Private Drives will be designed for a maximum vehicle speed of 10mph.

Where the Central Avenue is proposed along the primary street, no off carriageway access will be provided except at junctions.

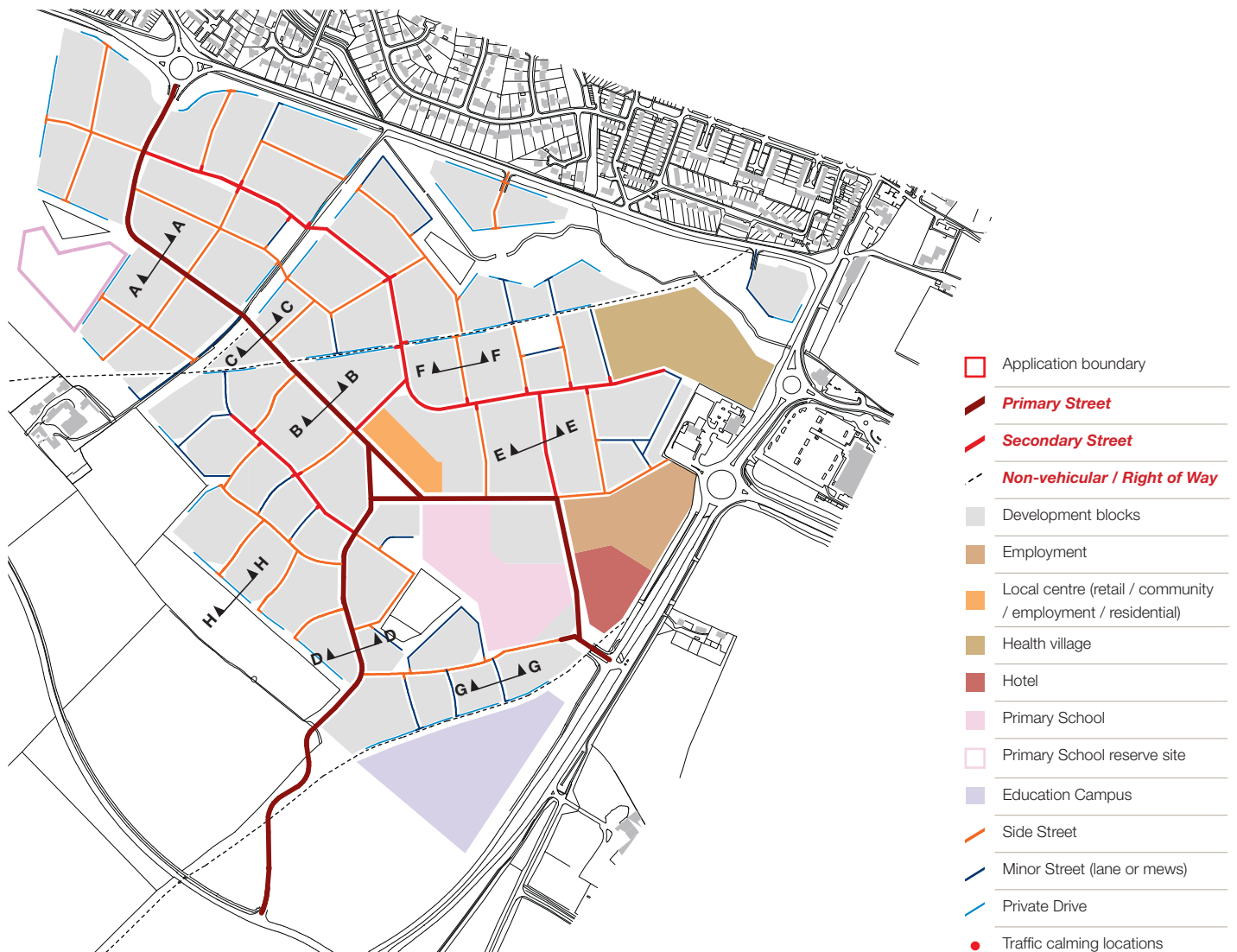


Figure 3.14 Street hierarchy plan – primary and secondary alignments only are mandatory (New perimeter road and main access junctions are shown built). Section lines refer to pages 54 and 55.





Table 3.15 Street hierarchy design parameters.

	Primary Street	Secondary Street	Side Street	Minor Streets / Mews / Country Lane	Private Drives	Footway / Cycleway	Footway
Design Speed	20mph	20mph	20mph	10mph	10mph	N/A	N/A
Footway	2m min each side	2m min each side	Varies 1.2m on one or both sides	Shared surface	None		2m min
Cycleway	On Road	On Road	On Road	On Road	None	3.0m Including footway	N/A
Verge	Whitelands character area only	Whitelands character area only	None	Varies according to character area	None	N/A	N/A
Bus Access	Yes	No	No	No	No	No	No
Maximum No. of Properties Served	No restriction	Up to 300	Up to 50	Up to 25			
Carriageway Width	6m with localised widening. Two 3.5 carriageways in Avenue character area.	5.5m minimum	Width variable. 4.8m min, widening to 6m minimum opposite garages & parking areas	Width varies from 3.5m min widening to 6 metres opposite garages & parking area, or to follow building line in mews	3.5 to 4.5m		
Access to Properties	Some direct access but generally only grouped access. No direct access from Avenue character area.	100% direct access	100% direct access	100% direct access	100% direct access		
Carriageway Surfacing	Non-porous construction hot rolled Asphalt with dark grey granite chippings	Non-porous construction hot rolled Asphalt with light grey chippings	Permeable concrete block paving (mid grey)	Permeable block paving or bound gravel (Addagrip or similar) *	Bound gravel (Addagrip or similar)	Bitmac / Breedon gravel or similar (in open space area)	N/A
Verge Surfacing	Grass with trees Whitelands character area only	Grass Whitelands character area only	N/A	Grass or ground cover planting	N/A		
Footway Surfacing	Impermeable concrete slabs (buff)	Impermeable concrete slabs (buff)	As carriageway surfacing	As carriageway surfacing	N/A	Bitmac	Bitmac
Kerbing	Conservation kerb (160mm) and 150mm channel block	Conservation kerb (160mm) and 150mm channel block	Conservation flush channel	Conservation flush channel	Conservation flush channel	Edgings	Edgings
Traffic Calming	At 150m intervals	At 60m intervals	At 60m intervals	N/A	N/A	N/A	N/A
Vehicle Swept Path	Buses	Refuse vehicles and Emergency Service vehicles	Refuse vehicles and Emergency Service vehicles	Refuse vehicles and Emergency Service vehicles	Motor vehicles	N/A	N/A
On Street Parking	Central chevron (Urban Village only)	Wherever possible	Yes	Yes		N/A	N/A
Forward Visibility	45m	33m	10m	10m	None	2 x 20	2 x 20
Junction Sightlines (X/y)	2.4 x 45m	2.4 x 33m	2.4x 25m	2.4x 25m		N/A	N/A
Junction Spacing - same side/other side	Cross-roads	Cross-roads	Cross-roads	Driveway cross-over	Driveway cross-over	N/A	N/A
Junction Radli	6m max – Maybe tighter subject to tracking	6m max – Maybe tighter subject to tracking	A minimum 3m. 6m at junction with urban spine	Splayed	Splayed	N/A	N/A
Street Lighting	Columns – to be agreed	Columns – to be agreed	Columns – to be agreed	Columns or wall mounted – to be agreed	None	Special column due to bat mitigation	6m max high column
Statutory Services	In footway. Drainage in carriageway	In footway. Drainage in carriageway	Carriageway. Infiltration drainage blankets. Demarked service strips with pins edging	Carriageway. Infiltration drainage blankets. Demarked service strips with pins edging	Within highway. Infiltration drainage blankets.	Varies	Varies

* **Note:** see Pingle Brook character area detail – pages 95-105