4.0 Transport
EAS has considered the benefits that may arise from a potential development at the site. Notably Trumpsgreen Road in the vicinity of the site has a modest bend, is narrow and with an undulating vertical alignment. These are all hazards from a road accident perspective. In fact, the bend at the junction of Beechwood Road has been the location of a serious accident in the previous 5-year period. Other accidents have occurred at fairly regular intervals along Trumpsgreen Road.

Proposed Access Roundabout
The proposed access alleviates some of these alignment issues in the vicinity and completely removes the bend. This is achieved by continuing the alignment of the road northwards into the site boundary and installing a new roundabout junction. There would be a branch off eastwards to rejoin Trumpsgreen Road. The existing alignment of Trumpsgreen Road around the bend would then be made into a no through route and just serve the existing house/s opposite, all traffic including newly generated development traffic would then use the new roundabout junction.

A roundabout at this location would form a gateway not only into the site but also into the Trumpsgreen area of Virginia Water. This would ensure a reduction in traffic speeds and a change in driver behaviour, it would therefore be highly appropriate to reduce the speed limit to 30mph in the vicinity of the junction and then along the urban area of Trumps Green Road providing a wider benefit in the area.

The roundabout would be suitable for all traffic and is likely to have an inscribed circle diameter of around 30m. In due course, the capacity of the roundabout would be modelled in ARCADY. The layout would meet the design parameters set out in the Design Manual for Roads and Bridges TD16/07 ‘Geometric Design of Roundabouts’. The accompanying Auto track diagram shows a largest legal (16.5m) articulated vehicle passing through the roundabout.

HIGHWAYS SUMMARY
A typical access would be formed from the roundabout into the development site. Internally the access and road layout would be based on ‘Manual for Streets’ principles. It would have a low speed environment with a sufficient access road to commence and separate pedestrian facilities; further into the site there would be a blend of shared surfaces with high quality pavement finishes for residential access, parking and congregational areas. Refuse collection and servicing would be considered throughout as well as suitable levels of car parking complying with policy standards.

Traffic Generation
In terms of traffic generation, the site would have peak hour trip rates of around 0.55 (houses) and for any flatted accommodation of around 0.35. For around 150 units it is expected that the site would generate between around 55 and 70 peak hour trips depending on the final mix. This is typically around 1 car trip per minute. There would be ample capacity at the proposed access roundabout for this level of traffic and of course this would be distributed in two directions probably on a fairly even 50/50 basis and so to the north and the south outside of the site there would be one car trip approximately every two minutes. One additional vehicle in the peak period every 2 minutes beyond the site boundary would be negligible and a very small percentage of the existing traffic flow.

Other Development
There are significant developments being considered or already under construction as part of the Long Cross Garden Village options. Around 200 units with some commercial is already approved and under construction, the remainder of the Garden village/s proposal could bring overall housing numbers up to 1520 homes plus 850,000 sqft of commercial. This is of course a significant development local to the site and the master plan proposes considerable improvements to local junctions and also further afield. The junction to the south (Kitsmead Lane) and north east of the Trumpsgreen Road development (Wellington Avenue) are proposed to be converted to signalised junctions, which will significantly increase their capacity if they come forward.

A development of this size will generate a considerable public transport demand and this is hinted at in the master plan text. It is anticipated that any bus route improvements would link to the more urban and central areas of Virginia Water and due to the proximities, any bus services are likely to have to pass the Trumpsgreen development site via the proposed site access roundabout. If this did occur it would be beneficial as the residents would be able to utilise these extended bus services.

The Trumpsgreen proposals are minimal in comparison to the Garden village/s and would generate only a fraction of the traffic of which some would probably be double counted as Trumpsgreen residents may well work at the Garden Village commercial site and attend the proposed schools and visit shops.

The Trumpsgreen development therefore would not conflict in traffic terms with the Garden Village proposals to any level of significance and could therefore come forward with or without the Garden Village development providing significant benefits in either circumstance.
5.0 FRA & Drainage
**RISK OF FLOODING**

**Rivers**
The site is in Flood Zone 1 according to the latest Environment Agency flood maps. The Runnymede Strategic Flood Risk Assessment (SFRA) classifies the site within the “Highly Unlikely” overall risk of flooding category, defined as <0.1% annual probability of flooding. The site is therefore not at risk of fluvial flooding. In addition, the site is at low risk of flooding from other sources such as surface water and groundwater. The South East Plan and Regional Flood Risk Appraisal shows that more than 20% of Runnymede is in Flood Zone 3 (100 year floodplain) including climate change. Climate change predictions have since been revised significantly upwards and therefore the percentage is likely to be much higher. The Runnymede SFRA summarises the overall risk of fluvial flooding in the borough as High to Very High. The site therefore offers a good opportunity to provide much-needed housing in an area of low risk of flooding within the borough which is subject to high risk of flooding in other areas.

**Surface Water:**
The site is not currently at risk of flooding from surface water. There is a dry valley to the west of the site near Trumpsgreen Road that is shown on the Gov.UK Long Term Risk Maps to be at “Low” risk of flooding. Minimal ponding would be expected in this area, with the valley joining another valley on the south side of Trumpsgreen Road where additional ponding is shown. Surface water runoff will be managed as close to source as possible. The masterplan minimises impermeable surfaces as far as is practicable. Green, Brown and Blues roofs will be considered along with rainwater harvesting to reuse water. In addition, external surfaces will be constructed using permeable materials. This will slow the rate and reduce the volume of runoff. Runoff will be managed safely for the 1 in 100 year including climate change rainfall event by incorporating swales and balancing ponds into the landscape. These features will provide dual benefit in the form of habitat to enhance biodiversity and ecology. Subject to satisfactory infiltration rates, and sufficient depth to groundwater, soakaways could be used to discharge rainfall directly to ground.

**Groundwater:**
The bedrock geology at the site is the Windlesham Formation over the Bagshot Formation (collectively part of the Bracklesham Group). The Windlesham Formation is an isolated outcrop across the northern half of the site. No superficial deposits are recorded, with the exception of River Terrace deposits along Knowle Hill, coincident with the carriageway. A borehole in Knowle Grove Close showed made ground over Bracklesham Beds, with water struck and standing at 2.50m BGL. The surface level of this borehole is unknown. It is assumed that the Bagshot and Windlesham Formations are in continuity, and therefore a spring line at the boundary is unlikely. Due to the slope of the site, flooding to any depth from groundwater is highly unlikely, and should groundwater emerge at the surface due to very high groundwater levels, this would follow overland drainage pathways.

**Impounded and Artificial Water Bodies:**
The site lies adjacent to but outside the precautionary zone of flood risk in the event of failure of the embankment at Virginia Water. (SFRA figure 4.3). There are no other sources of flooding.
SURFACE WATER MANAGEMENT

The proposed development also offers an unparalleled opportunity to manage surface water runoff from the site sustainably in accordance with the SuDS hierarchy, the Surrey County Council guidance document, “Water, People, Places” and local planning policy. Although predominantly greenfield, the site does contain some pre-existing development and associated infrastructure. There is potential to reduce runoff from the site that may currently contribute to the area of flood risk on the south side of Trumpsgreen Road, thus reducing the risk of flooding to third parties.

The proposed development offers an unparalleled opportunity to sustainably manage surface water runoff from the site. The SuDS hierarchy will be followed:

<table>
<thead>
<tr>
<th>Most sustainable</th>
<th>SuDS technique</th>
<th>Flood Reduction</th>
<th>Pollution Reduction</th>
<th>Landscape &amp; Wildlife Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green roofs</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Basins and ponds</td>
<td>1. Constructed wetlands</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>2. Balancing ponds</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Detention basins</td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>4. Retention ponds</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Filter strips and culverts</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Infiltration devices</td>
<td>5. Soakaways</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6. Infiltration trenches and basins</td>
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<td></td>
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<tr>
<td>Permeable surface and filter drains</td>
<td>7. Gravelled areas</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>8. Solid paving areas</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>9. Penut paviers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tanked systems</td>
<td>10. Over sized pipes/ tanks</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>11. Box storage systems</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

As per the Surrey County Council guidance document, “Water, People, Places”, the following elements would be considered in the site design:

1. **Prevention**
   The site design would be such that permeable surfaces are maximised across the site. A relatively low density format is proposed, with plenty of garden and landscaped areas.

2. **Source control**
   Permeable paving would be used in all driveways and roads where adoption is not required. There are opportunities to incorporate green roofs into the apartment villas through intelligent design, and water butts would be provided for rainfall re-use at all dwellings. The Bracklesham Group is highly permeable aquifer, designated by the Environment Agency as a Minor Aquifer with Intermediate vulnerability. The site is not in a groundwater source protection zone.

   Subject to satisfactory infiltration rates, and sufficient depth to groundwater, soakaways could be used to discharge rainfall directly to ground. Infiltration rates and groundwater depth will be confirmed by site investigation. If found to be suitable, this would prevent any runoff from roofs and hard surfaces entering the surface water drainage network.

3. **Site control**
   On the basis of the borehole at Knowle Grove Close, it is possible that the depth to groundwater will not be sufficient to discharge to soakaway, particularly in the lowest areas of the site. There is plenty of space on the site to incorporate swales, filtration and other SuDS treatment solutions in the site management of surface water, for example alongside roadways.

4. **Regional control**
   Even if soakaways cannot be used, there is an opportunity to manage some or all surface runoff in a combined water feature/infiltration basin located at the southern extent of the site if practical, which would allow natural groundwater recharge. The topographic survey shows a ditch along the southern boundary (Trumpsgreen Road) and a 150mm diameter pipe beneath the site access. A headwall on the western side of the site access shows a 225mm diameter pipe with a lower invert level suggesting water flows in a southwesterly direction. However, it is not known where this pipe ultimately discharges.

Previous planning applications in the area have expressed intent to discharge surface water to soakaway, although no designs could be identified. There appear to be gullies and drains within the carriageway of Trumpsgreen Road, however there are only a few. In the absence of any evidence to the contrary, it is assumed that highway drainage discharges to ground.
SURFACE WATER MANAGEMENT - SUDS PHOTOGRAPHS

- Dry Swale
- Balancing Ponds / Detention Basins
- Shared Surface Permeable Paving
- Balancing Ponds / Detention Basins
6.0 Initial Sketch Diagrams
METHODODOLOGY AND SCHEME DEVELOPMENT

The proposals have been developed following extensive research. We have undertaken a detailed analysis of the constraints which affect the site such as trees, landscape, topography and the wider context.

A detailed topographical survey and a tree survey were carried out at the very outset. Working with this information and following input from speed surveys and the existing condition of Trumpsgreen Road the first move was to consider the optimal access to the site. The Highways Consultant proposed a new Roundabout, which was our starting point for the initial schemes.

As part of this detailed research we also considered the surrounding development grain. The surrounding residential is predominantly housing with a mixture of plot sizes and scales. The properties within the adjacent Wentworth Estate are separated by the golf course and are therefore not representative of the local character. Nonetheless our initial schemes were based on delivering housing only.

Our initial scheme was based on a development of housing only. A main access route was created from the new roundabout serving a series of secondary access routes which ran against the existing green buffers at the site’s edges forming parcels of development. It was immediately clear that to provide the sustainable development required, the houses would need to be small with minimum standard levels of amenity and separation. In essence the proposal would likely have seemed Urban and not in keeping with the surrounding character.

Option 1

Option 2 was developed as a variation on Option 1. It is again based on the principle of perimeter roads fronting the green buffers and framing the new green infrastructure. Within this option the addition of a small number of apartment buildings at the main entrance to the site coupled with smaller houses with smaller plots and minimal separation does enable the sustainable use of the site but it does so with a greater number of roads serving an increased number of development ribbons.
METHODOLOGY AND SCHEME DEVELOPMENT

In response we developed a further set of options which looked to reduce the amount of access roads, hard surfacing and therefore improved the overall balance between built form and open space. The options below all adopt the following principles:

- A generous and expansive tree lined main access avenue is formed as the primary access route into the site feeding a series of secondary, sharded surface routes.

- A parcel of substantial houses is proposed along the northern edge with a considerable set back from the houses on Knowle Hill and the existing green buffer which exists along this boundary.

- We have reduced the number of development ribbons with the existing areas of green buffer enhanced to create new green infrastructure

- The overall aim of these units was to propose a development which sits more comfortably within the surrounding context, where the development sits adjacent to and overlooking new high quality landscaped areas.

These options suggest a development grain which feels more comfortable and strikes a better balance between the built form and the landscape; however as purely housing, will not deliver a sustainable form of development on the site.
**METHODOLOGY AND SCHEME DEVELOPMENT**

The next stage explored the benefits of using varying densities across three distinct swatches of the site. The access layout creates a ribbon of development along the northern and eastern edges which responds to the character of the properties immediately adjacent. The two linear access routes form a parcel of medium density development and the southwest corner, which sits some 6 metres lower and within a dense existing green buffer, can accommodate a series of detached buildings reading as substantial villas in a parkland setting. These buildings can house apartments. The general principles of this approach are further explored in the following pages with the various layers added to develop the draft Masterplan.
METHODOLOGY AND SCHEME DEVELOPMENT