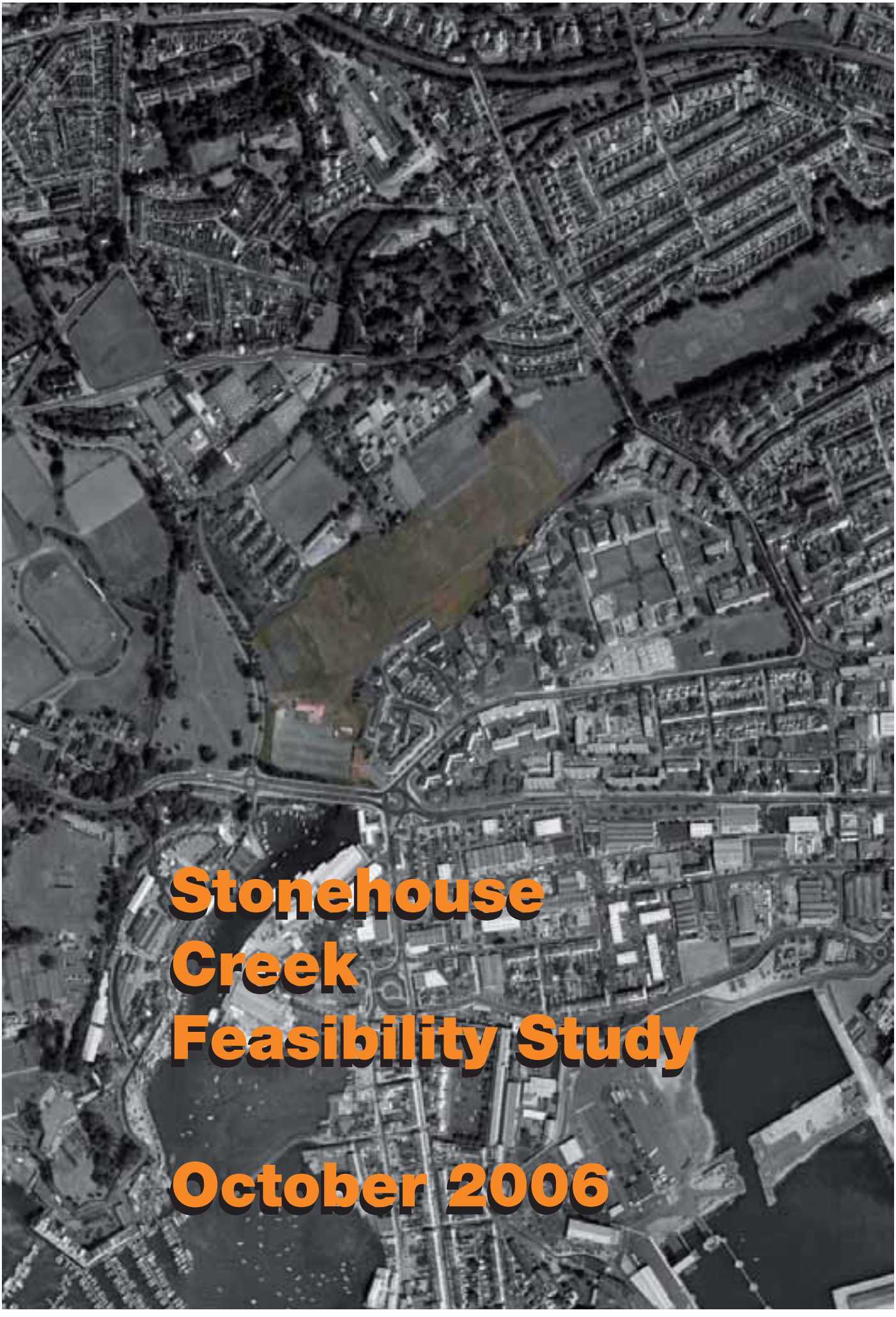

Stonehouse Creek Feasibility Study

October 2006

Feasibility Study for a new secondary school on Stonehouse Creek, Plymouth

October 2006

Report produced for Plymouth City Council

by LDA Design
in association with Scott Wilson and Exeter Archaeology

Contents

1 Introduction

LDA Design were appointed by Plymouth City Council (Corporate Resources) to undertake a feasibility study to determine whether a new 10-form entry secondary school (as a combined school replacing Stoke Damerel and Parkside Schools) would be feasible on a site at Stonehouse Creek. The study forms part of the background work needed to identify a preferred option for a new school within the Area Action Plan.

The main aim of the study is to assess the physical capacity of the site to accommodate a school of the proposed type and size. This involves analysis of a range of factors that may influence the potential developable area, or the layout and design of the buildings, such as:

- the physical extent of land available for development;
- existing tenure and land uses within and adjacent to the site;
- ground conditions and flood risk;
- the presence of utilities within and around the site;
- impacts on any features of archaeological or historic interest;
- traffic and car parking issues;
- landscape and urban design issues that may influence the siting, layout and design of buildings and external areas associated with the school.

LDA Design were assisted by Scott Wilson and Exeter Archaeology on geotechnical, contamination, utilities, transport and archaeological aspects of the study. Their findings have been summarised within the main report, while individual reports are contained within the appendices.

The short timescale for the study meant that this was largely a desk-based exercise, relying upon the information that it was possible to obtain within the time available. There are consequently some gaps in the information and a need for more detailed investigations in some key areas, and these have been highlighted in the individual reports. The desk study was supported by site visits, published guidance, and anecdotal information (e.g. from the manager of the Stonehouse Community Centre). Despite the information gaps, we believe that the key issues have been identified and that the findings of the study can be viewed with a good degree of confidence. Although the study did not address the financial viability of the proposal, any significant cost implications that have arisen incidentally in the course of our research have been flagged up for further consideration by the Council.

In this report we have:

- described the general characteristics of the site, including its location, extent, land uses, ownership and physical characteristics;
- calculated the area requirements for the new school using best practice guidance produced by the Department for Education and Skills;
- examined the range of factors that could potentially influence the capacity of the site and the layout and design of the new school;
- drawn conclusions based upon this analysis, supported by an example schematic layout of the school buildings and facilities.

2 Site characteristics

Site area and land ownership

The Stonehouse Creek site comprises the area of open land lying to the north of the A374 at Stonehouse Bridge, which effectively separates the built form of Stoke to the north and Stonehouse to the south. It is bounded to the west by King's Road and by the road at Mill Bridge to the east.

A plan showing a red line boundary of the study area was provided by the Corporate Resources team at PCC (see Figure 1), as indicative of the area potentially available for development of a new school. The area outlined in black was identified by PCC as the most suitable location and approximate extent of land required for the new school (calculated as an area of 15,156m^2).

Land ownership information has been received from the Senior Valuation Surveyor at PCC (see Figure 2). Time constraints have limited the opportunity to look into title documents to see if any restrictive covenants apply which may affect proposals for school development.

From the available information, the red line boundary on Figure 1 appears broadly to follow the extent of PCC land ownership. It excludes land sold to the Devonport High School for Boys and to Plymouth College of Further Education and also excludes land surrounding the new Stonehouse Community Centre, which is leased to Stonehouse Creek Community Development Trust Ltd on a 50 year lease (the freehold reversion is owned by PCC). It does, however, include leasehold land at The Rectory rugby ground and land owned by SWRDA at the southern end of the Creek, which was the site for the former Stonehouse Community Centre and car park.

In this study, we have used the areas outlined in red and black as our principal area of search but have refined the boundaries slightly to reflect physical/ownership boundaries on the ground and to exclude The Rectory site from the reckoning. We have broadened our area slightly to include land immediately to the north and south of the Community Centre and car park, in case this provides opportunities for integration of the building with the new school. We have also included the embankment of Stonehouse Bridge and land alongside Kings Road (owned by SWRDA) as these can potentially provide space for habitats. Our refined study area boundary is shown in Figure 3 and equates to a total site area of around 73,200m^2.

Physical characteristics and existing uses

The site comprises low-lying land which was formerly occupied by the tidal pool of Stonehouse Lake, until around 1930 when the northern tip was reclaimed. During WWII, Stonehouse Bridge was dammed, severing the connection with the creek to the south. Infilling with demolition rubble took place after WWII, and continued up until the 1970s when the area was infilled with inert waste materials.

The resulting artificial landform comprises a large, level platform of made ground across the south-western end of the site, which drops suddenly to a lower platform across the middle

and east of the site. Two other raised platforms are occupied by sports pitches owned by Devonport High School, to the north and far east of the site.

The southern extremity of the site was formerly occupied by a community centre building (now demolished) and associated car park. The buildings slabs remain and the car park is used occasionally (e.g. for car boot sales), but the site is in a derelict condition. A new community centre was built in 2001, just to the north of the old one, with a small car park adjacent to it and access off King's Road. The remainder of the site is occupied by grass sports pitches, evidently well-used by the local community and, at times, by the Devonport High School for Boys (DHSfB) for rugby, cricket and American football.

The site is enclosed by landform and buildings on all sides. Land at the far southern end lies well below the road level of Stonehouse Bridge and is enclosed by the high, steep and well-treed embankment, limiting views into the site from the road. Ground levels also rise steeply along the western boundary and beyond Kings Road, where open space has a parkland character and provides an attractive backdrop to the site. A number of buildings overlook the site and provide attractive frontages, particularly the fine arcaded face of the DHSfB (former Royal Military Hospital), the older terraced houses along this boundary and the stone buildings of the Royal Naval Hospital on the opposite side of the playing fields. Mature trees along the far eastern end and around other parts of the boundary add to its enclosed character.

3 Secondary school area requirements

Pupil numbers

The site and building area requirements for the new secondary school have been calculated according the guidance provided in *Building Bulletin 98: Briefing Framework for Secondary School Projects* produced by the Department for Education and Skills. This is a revision of BB82: Area Guidelines for Schools (Secondary Section). This guidance provides key formulae for calculating minimum building and site areas based upon the number of pupils (N) and the type of secondary school (see Appendix 6).

The brief stipulates a 10 form entry secondary school for 11 – 18 year olds, i.e. 10 forms per year group (a combined school based on a replacement for Stoke Damerel and Parkside Schools)[1]. The given number of pupils per form is 30. BB98 specifies that the stay-on rate for sixth form is assumed to be 62.5%.

The calculation for pupil numbers (N) is therefore as follows:

5 years (11-16) @ 30 pupils per year x 10 forms	=	1500
2 years (sixth form) @ 18.75 pupils per year (i.e. 62.5% of 30) x 10 forms	=	375
Total pupil numbers (N)	=	1875

Site and building area calculations

The key formulae given in BB98 are the minimum areas recommended, and an area greater than the minimum, but within a zone outlined in the Bulletin, will normally be required. Therefore, the Stonehouse Creek site must be able to accommodate at least these minimum area requirements.

The calculations are shown in Table 1 and the key formulae have been applied as follows:

- the number of pupil places (N) = 1875;
- the formulae for '11-18 secondary schools have been used;
- the 'net building area' has been calculated directly from the formulae and comprises the floorspace requirements for basic teaching, halls, learning resources, staff and administration, storage, dining and social, and an allowance ('float') for enhancement of the area provision for these categories, or for supplementary teaching areas;
- the 'gross building area' has been calculated directly from the formulae and comprises the net building area plus space requirements for toilets and personal care, kitchen facilities, circulation, plant and the area of internal walls;
- the 'net site area' has been calculated directly from the formulae for secondary schools in confined sites[2] and comprises, games courts (MUGA), soft informal and social spaces, hard informal and social spaces, and habitat areas;
- the 'total (or gross) site area' has been calculated by combining the net site area and figures for other 'non-net' areas for 'buildings and access', including the footprint of buildings (@ 50% of gross building area, assuming 2-storey structures),

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[1] If the new school were to be a stand-alone secondary school (rather than combined school) the total number of pupils, at 6FE, would be as follows:

5 years (11-16) @ 30 pupils per year x 6 forms	=	900
2 years (sixth form) @ 18.75 pupils per year (i.e. 62.5% of 30) x 6 forms	=	225
Total pupil numbers (N)	=	1125

[2] This is because the total site area potentially available (c. 73,200m²) is too small to accommodate the total building and site area requirements, including sports pitches at 72,625m².

refuse/deliveries access, entrance paths and roads, car parking and drop-off and bicycle storage. As no specific formulae are provided for such areas, they have been estimated using professional judgement and typical standards (e.g. for car parking);

- in addition, the area requirement for sports pitches has also been calculated (using the formulae for unconfined sites) to see how much provision would be required off-site.

Table 1: Area calculations for a 10 FE secondary school on confined site

Pupil numbers (N)		
5 yrs @ 30/yr x 10 forms		1,500
2 yrs @ 62.5% x 10 forms		375
Total (N)		**1,875**
Minimum building areas	**Formula/calculation**	**Area (m^2)**
Basic teaching	200+3.06N	5,937
Halls	600+0.3N	1,162
Learning resource areas	125+0.29N	668
Staff and administration	125+0.31N	706
Storage	200+0.36N	875
Dining and social areas	100+0.26N	587
Float	250+0.32N	850
Total Net Building Area	**1600+4.9N**	**10,787**
Likely Gross Building Area (GBA)	**2250+7N**	**15,375**
Minimum net site area		
soft informal and social	600+2.5N	5,287
games courts (hard)	2000(MUGA)	2,000
hard informal and social	200+1N	2,075
habitat	0.5N	937
Total net site area		**10,300**
Minimum buildings and access		
Building footprint (2-storey buildings)	GBA/2	7,687
car parking	143 spaces @20m^2/space	2,860
access, service, external circ, bike storage	notional allowance	2,000
Total buildings and access		**12,547**
Total site area		
Total net site area		10,300
Total buildings and access		12,547
Total (gross) site area		**22,847**
Total available site area		**73,200**
Total site area required		**22,847**
Total sports pitch requirement	**10000+35N**	**75,625**

Area available for sports pitches on-site		**50,352**
Total off-site sports pitch requirement		**25,273**

The table demonstrates that, on overall site area alone, Stonehouse Creek has the capacity to accommodate the minimum building and site area requirements for a 10 form entry secondary school, providing that:

- a proportion (around a third) of the sports pitch requirement can accommodated off-site;
- building heights of at least two-storeys are achieved.

However, there are a variety of other factors which may influence the potential area available for accommodating the school, or the configuration of buildings and uses. These are dealt with in the following section.

4 Factors affecting site development

Research has been undertaken into a variety of factors, other than the overall size of the site, that could affect its potential to accommodate the new school, or that may influence site planning and design. The key points arising from this research are summarised in Table 2, while further detail is contained within individual reports in the Appendices.

Table 2: Key factors affecting development potential and layout

Factor	Key findings	Implications
Overall size of site	Total site area (within red line boundary but excluding The Rectory) = approx. 66,000m^2 Total extended site area (including land to north and south of community centre) = approx. 73,200m^2. Area within black outline = approx. 15,000m^2. Total site area required for school: without pitches = approx. 22,847m^2 with pitches = approx. 98,472m^2	Total site area insufficient to accommodate full area requirements recommended in BB98. Site therefore deemed 'confined' and off-site provision of a proportion of sports pitches will be required. Buildings will need to be at least 2-storeys high to fit within area outlined in black and to allow for associated access, parking and hard play space in this area.
Land use and ownership	Land to south of site (former community centre and car park land) owned by SWRDA. Remainder of land within site area in PCC ownership but Community Centre on 50 year lease and assume to be retained. Sports pitches in frequent use by local community and by DHSfB. Restrictive covenants not yet fully investigated.	SWRDA cooperation critical to development on southern land and overall viability of project. Shared-use or off-site replacement of pitches for community (and DHSfB) use may be required. Need to provide sensitive integration of new school with community centre and consider amenity of neighbouring uses. Need to be satisfied that no restrictive covenants affecting use of land.
Contamination	Former lake infilled with inert wastes (demolition wastes) and asbestos cement, neither of which should give concerns regarding migration of gases or leachates. Pollution incidents (6 recorded) on site, or within the vicinity, could give rise to potential contamination from oils and/or sewage within the groundwater beneath the site. No other obvious sources of site contamination. Former Devonport Station could be source of contaminants of groundwater beneath the site.	Potential for methane gases to be generated by the alluvial deposits may require remedial measures within any future development.

Geotechnical conditions	Ground stability affected by significant thickness of landfill material and alluvial deposits – moderate risk of compressible ground stability hazards. Anecdotal evidence (unconfirmed) that new community centre was piled to depths of approx. 20-30 metres below ground level where bedrock encountered.	May be necessary to use pile foundations below the school buildings (to depths of 20-30m bgl) which may prove prohibitively expensive.
Flood risk	Most of site situated in Flood Zone 1 as defined in PPS25 (less than 1 in 1000 chance of river and sea flooding in any year) and has low probability of flooding. Portion of the site in south east corner is located within Flood Zone 2 (between a 1 in 100 and 1 in 1000 chance of river flooding, and 1 in 200 and 1 in 1000 chance of sea flooding). No existing flood defences or flood alleviation measures noted on site. Evidence that watercourses beneath the ground surface in the site drain the upstream catchment. Anecdotal evidence that community centre and surrounding land built up to alleviate waterlogged and boggy conditions experienced in central, low-lying pitch area of playing field. Waterlogging most prevalent when combined with high tides causing increased saturation of underlying substrate. Environment Agency indicated that localised flooding probably caused through inadequate sewer capacity.	All proposals in Flood Zones 1 and 2 should have regard for: • vulnerability to flooding from other sources • potential to increase flood risk elsewhere through surface water run-off. • reducing flood risk through layout and form of development • mitigating potential increases in flood risk through SuDS techniques. • residual risks of flooding after existing and proposed flood management and mitigation measures are taken into account. All major developments within Flood Zone 1 and 2 will require a flood risk assessment. For purposes of this feasibility study, assume advisable to avoid locating buildings in areas potentially most susceptible to flooding (i.e. Flood Zone 2 in south east corner of site). Central, low-lying areas of playing fields may require remedial work to improve drainage, or increase in area of hard surface/MUGA to substitute for grassed areas that are unusable when waterlogged.
Archaeology	Listed Buildings adjacent to site: Stonehouse Bridge - Grade II Royal Naval Hospital and jetty (at Millfields) - Grade II	Impact of development on Listed Buildings and their setting will need to be taken into consideration.

	Royal Military Hospital (now Devonport High School for Boys) Grade II* Conservation Areas adjacent to site: Stoke Royal Naval Hospital 8 boreholes dug in 1990s in area immediately to north of bridge – no archaeological material recovered (apart from a single hazelnut 15m below ground level). Unlikely to be any below ground archaeological interest in Stonehouse Creek except at very great depths.	In particular, any proposed development which would affect the setting of the Hospital/School would require statutory consultation with English Heritage. Uninterrupted view across the creek to arcaded south face might be area of concern. Setting of Conservation Areas will also need to be considered. Assume advisable to site development at Stonehouse Bridge end of creek to maintain open setting of LB/CA and uninterrupted views between hospital sites.
Utilities	Not all information received from main local utility providers at this stage, so information incomplete. Two combined sewers run across the site to the north of the existing car park – depth, size and capacity not known and may need diverting, depending on plan of proposed school. Third combined sewer, 1150 diameter, runs along east of site through Waterloo Court and cuts across south east corner of site. Number of low pressure gas mains near the site – awaiting confirmation of whether sufficient capacity in the local network. Existing low voltage electrical connection to the site, both 11kV and 132kV cables in the area, as well as two substations within 300m of the site - awaiting confirmation of whether sufficient capacity in the network. Potable water mains in both Kings Road and on Stonehouse Bridge - awaiting confirmation of whether sufficient capacity in the network. 600mm diameter storm drain just north of proposed site but unclear what this connects to. 225mm diameter storm water drain runs from the west and discharges into Stonehouse Pool at western edge of Stonehouse bridge. Short run of storm drain discharges road run-off in the Stonehouse Pool at the eastern end of Stonehouse bridge.	On the basis of available information, previous records and enquiries, two combined sewers are the only services that cross the site that may need diverting to accommodate the proposed school development. Subject to approval of the EA, the storm drainage may be able to be attenuated and then discharged directly into Stonehouse Pool. If not acceptable, there is a storm drain to the north of the site although details currently unknown
Access and parking	Access to the school by all modes of transport will be important and encouraging pupils to walk, cycle and take the bus should be a key consideration of the development of the site. Appears appropriate to use existing community centre access onto Kings Road as vehicular	Pedestrian and cycle permeability is important and access should be available from the east and west sides of the site and consideration given to links across the fields

	access for development. Located away from local residents which reduces nuisance associated with the school run. Kings Road will become busier and care needs to be taken in accommodating 'kiss and ride' activity associated with the school. Kings Road wide enough to accommodate some parking along its length but likely a lot of this will be taken up by pupils at College of FE. Assessment of likely parking demand based upon 1900 pupil school and using information from TRICS database: • average pupil/staff ratio is 0.1 staff per pupil • average car park space/pupil ratio is 0.8 spaces/pupil, which equates to 143 spaces • approx requirement of 20m^2/space • approx requirement of 2,860m^2 allocated for parking.	to the north. Utilise existing vehicular access off Kings Road. Need to allow adequate space for drop-off within the site to reduce impact on Kings Road. Allow approx 2,860m^2 within site for car parking (staff and visitors).
Urban/landscape design considerations	Land at southern end of site (former community centre and car park land) has degraded, neglected character which could be significantly improved by development of high quality new building. Open playing fields on Stonehouse Creek are bordered by some fine buildings (particularly Devonport School), a small row of attractive Victorian terraced housing and some mature trees which all contribute to its attractive, enclosed character. Views to and from these features and overall open character of central/northern part of site should be maintained. Character of these buildings could inform form and design of school buildings. Development of school could help to 'close the gap' to the southern end of the site where less attractive views of housing and development to the south of Stonehouse Bridge detract from landscape character and quality. This development should front onto the open space, rather than turn its back to it, to fit in with other surrounding buildings. Significant drop in level between road and site along Stonehouse Bridge affects potential for road-level access and frontage but provides opportunity for higher density, 3 to 4 storey development at this location. Community Centre is to be retained – need to	Concentrate buildings at southern end of site where they will have greatest benefits in terms of improving the character and quality of Stonehouse Creek. Protect the essentially open character of the playing field area and use building form at the southern end to complete the enclosure of this space. Make reference to features which give Stonehouse Creek it's particular character (e.g. colonnaded frontage of Hospital/school and terraced land form) in new development, to strengthen the positive character of the Creek. Opportunity to use multi-storey building form to reduce land-take, to incorporate uses such as car parking, storage and service facilities and to have greater visual impact at road level. Include rather than isolate Community Centre in school

	integrate properly within site layout and design of new school so it becomes part of a whole, rather than disjointed collection of buildings.	building layout.

4 Conclusions

Conclusions of site analysis

We have drawn the following conclusions from our analysis of the various factors influencing the potential of the site to accommodate the new secondary school:

1. The total available site is not large enough, in overall area terms, to accommodate the full area requirements recommended in BB98.

2. There are apparently no realistic opportunities to extend the site area beyond the existing boundary. The site is confined by property and land ownership constraints to the north and east and by the physical constraints imposed by the Bridge and creek to the south. Land to the west of Kings Road is within PCC ownership but slopes steeply upwards and has a very attractive parkland character, forming part of an important strategic green finger of landscape. Kings Road itself is a physical barrier which would require bridging and the site would be physically unsuitable for the sorts of uses demanded by a school.

3. The site is potentially large enough to accommodate the **reduced area requirements** set out in BB98 for schools on confined sites, but this will require at least 33% of the recommended area for pitches being provided off-site and reduced provision in informal/social areas, games courts and habitat. The viability of this site depends upon the possibilities for identifying such off-site provision. It is unlikely that the DHSfB would have any spare capacity on their pitches that could be shared, given that the school currently also relies upon use of the community pitches on the Stonehouse Creek site. The nearby Brickfields site has the scope to intensify use of its site, increasing its useable capacity in the process. Development options for Brickfields involve possible acquisition, or use, of the MoD's Rectory rugby ground; Brickfields and The Rectory might therefore be able to accommodate some of the demand for additional pitches off -site from a new school at Stonehouse Creek, as well as community and DHSfB use, but this requires further investigation.

4. Analysis of historic buildings, urban/landscape character, ground conditions and the amenity of surrounding residents/uses, concludes that development of buildings should be concentrated in the southern end of the creek adjacent to Stonehouse Bridge. This would not only protect the positive attributes of the Creek but provide improvements in the area which is most visible and which needs them the most. With the right approach, it provides an opportunity to create a striking, landmark building that could lift the quality of the whole surrounding area, with knock-on benefits for economic regeneration in this part of Plymouth.

5. To protect the open character of this area, to create continuity in enclosure and to protect the amenity of the community centre and surrounding buildings, the new school buildings should probably not encroach into the playing field area beyond an arc drawn along the frontage of the existing Community Centre both eastwards and northwards. This building line is slightly further to the south than the 'black line boundary', reducing the estimated area for buildings at this southern end.

6. Buildings should ideally be not be located in the extreme south-eastern corner of the site which has a high susceptibility to flooding. The precise extent of Flood Zone 2 is not known but we have estimated that an area of around 1,250m^2 may be so constrained (based upon crude flood risk mapping provided by the Environment Agency). This reduces the potential area for buildings within the black line boundary but this area could still be used for outside informal/social space.

7. The southern end of the site needs to accommodate not just the school buildings but also those ancillary uses which need to be in close proximity or integrated with the buildings. This includes site access, drop-off and external circulation space, bicycle storage, car parking and a reasonable element of hard informal and social space. The combined total area requirement for these elements is around 14,600m^2. Given that the black line boundary area of 15,156m^2 has been reduced by drawing back the building line, this is potentially a very tight fit. In reality, a practical layout can probably only be achieved by increasing building heights above two storeys (to reduce the building footprint) and/or doubling up on space by incorporating car parking/bike storage and possibly other uses underneath the building. A taller building rising above the embankment would have advantages in urban design terms, as it would have a much greater presence as a landmark building when viewed from the road and neighbouring areas.

8. The ground conditions on site are potentially the most limiting factor to development of the school. The potential need for piling to depths of 20-30m below ground level across the built areas could prove extremely, possibly "prohibitively", expensive. The likely flood risk requires further investigation and could further reduce the potential developable area or require flood defence or alleviation measures to be incorporated. The problem of waterlogging also gives rise to concern and may require mitigation through improved drainage, ground raising or additional multi-use games area (MUGA) provision to compensate at times when there is significant waterlogging of pitches. The additional costs of these measures may render the scheme unviable in cost terms and will need to be tested in order to provide the necessary confidence in the feasibility of this site option.

Example schematic layout

Figure 3 illustrates one possible example of how the broad configuration of the school buildings and external areas could be designed to fit within the constraints and design parameters outlined above. The layout is only indicative of a possible solution but has not been properly tested for its viability as a workable school layout. The area calculations are also only rough but they demonstrate that a 'fit' is possible, but tight, requiring careful and very efficient design of space and buildings (see Table 3).

Table 3: Approximate area calculations for example schematic layout

Facility	Min recommended area	Area allocated (approx.)	Notes
Building footprint	7687	8000	Based on 2 storey buildings
Car parking	2860	3000	Entirely located underneath buildings
Access, circulation, bicycle storage	2000	3200	Includes area to north of existing Community Centre car park assuming possibility of shared access
Hard informal and social areas	2075	5350	Over-provision could allow for some flexibility in space for circulation, parking etc. in 'courtyard' entrance area between buildings
Soft informal and social areas	5287	6600	Over-provision could allow for some additional MUGA
Games courts (MUGA)	2000	4400	Over-provision helps to offset playing field deficit – could potentially increase by additional provision of MUGA on soft informal/social areas
Pitches	75625	33300	Deficit to be provided off-site
Habitat	937	9650	Appears to be significant over-provision but comprises series of small areas around periphery of site to provide corridors for wildlife

Overall conclusion

In summary, the site could potentially accommodate a new secondary school but its viability would depend upon off-site provision of some sports pitches and very efficient design of buildings to minimise the building footprint and overall land-take. Potential problems associated with ground stability and flood risk may seriously prejudice the financial viability of the proposal and require further investigation. On the positive side, there could potentially be enormous benefits for the immediate and wider community through the creation of a well-designed, high quality new school, that would help to attract new people and investment and engender a sense of pride in the local area.

STONEHOUSE SCHOOL FEASIBILITY STUDY

GEOTECHNICAL AND CONTAMINATION CONSTRAINTS

INITIAL ASSESSMENT

Introduction

It is intended to re-develop the Stonehouse Creek Playing fields in the vicinity of the community centre at Stonehouse, Devonport. In order to assist in the preparation of a master plan, a brief land quality assessment has been carried out. This involved reviewing geotechnical and geo-environmental data concerning the site, obtained from documentary sources such as Landmark Information Services and conversations with Plymouth City Council. The site was visited on the 22nd September and a brief site walk over was conducted.

Site History

The earliest available maps of the area show the site to be occupied by the Stonehouse Lake, a tidal pool. To the north of the site is the former Devonport railway station and the Great Military Hospital, to the east of the site is the Stonehouse Pool Furniture Works and a timber yard, a railway line bounds the site to the west and the Stonehouse Bridge bounds the site to the south. The site remained within an area recorded as Stonehouse Lake until around 1930 when the northern tip of the lake appears to have been re-claimed.

After World War II it is believed that the site may have been locally infilled with demolition rubble and infilling of Stonehouse Lake may have continued at a gradual rate up until the 1970s when the area was infilled with what is understood to have been inert waste materials and asbestos cement waste. By 1992 the southern part of the site was occupied by a community centre building and associated car park. In 2001 a new community centre was built on site, just to the north of the old one. The old community centre has now been demolished, but the associated car parking and building floor slabs still remain on site.

Geology

According to the BGS map sheet 348 1:50,000 Plymouth solid and drift geological map the site is underlain by made ground, which overlies alluvium and slate bedrock (Torpoint Formation). The infilling with made ground is likely to have started sometime after World War II and continued until the 1970s where inert waste materials and asbestos cement waste were used to infill the area.

Contaminative Features in Surrounding Areas

The following historic features may have contributed locally to contamination:

- An abattoir situated to the east of the site, beyond which was a warehouse and a steel works.

- The former Devonport Station situated on the east side of Kings Road with the railway adjacent to the western boundary of the site.
- Refuse heap located adjacent to the northeastern corner of the site.

Other Environmental Issues

- There have been 6 pollution incidents to controlled waters both within the site and up to 250m from site. The three pollution incidents located on site involved the release of waste oils (Category 2 – significant incident) and Category 3 incidents (minor) of crude sewage and diesel. All incidents are located towards the southern end of the site.

- There is one discharge consent located just to the south of the site underneath the Stonehouse Bridge. This is operated by South West Water and accepts sewage discharges from several different locations.

- There is one licensed water abstraction point located approximately 200m to the southeast of the site boundary, this is operated by Regent Brewery and is for industrial cooling use. No other abstractions are located within 250m of the site boundary.

- The nearest fuel station is Millbridge service station which is located approximately 500m to the north east of the site.

Radon

According to the Envirocheck report less than 1% of the homes within the area are above the action level for Radon, it is therefore considered that radon protective measures would not be required at this site.

Potential Sources of Contamination

On-Site

Based on environmental data to date, the following are possible on site sources of contamination that could affect the site:

- The former Stonehouse Lake was in filled in the 1970s creating the Stonehouse playing field landfill site. According to the Envirocheck report the lake was in filled with inert wastes (demolition wastes) and asbestos cement products neither, of which should give concerns regarding migration of gases or leachates.

- Pollution incidents on site could give rise to potential contamination from oils and/or sewage within the groundwater beneath the site.

There are no other obvious on site sources of contamination, however the former community centre may have included facilities such as heating oil tanks. There have also been some cut and fill operations associated with the new community centre at the site in order to raise the land to alleviate the waterlogged conditions experienced in the lower parts of the site, this may have involved the use of imported fill material.

Off-Site

Based on environmental data to date, the following are possible off site sources of contamination that could affect the site:

- The former Devonport Station located to the north of the site and the former railway lines located adjacent to the western boundary of the site. Due to the location of the station up gradient of the site and the low ground level of the site, contaminants could potentially migrate and contaminate the groundwater beneath the site.

- Pollution incidents, which occurred within the vicinity of the site, could give rise to groundwater contamination of potentially oils and sewage.

Geotechnical Conditions

The site was in filled with inert landfill waste in the 1970s, understood to comprise mainly building/demolition waste and asbestos cement products. This is likely to be locally underlain with demolition rubble used to infill the area shortly after World War II. This is in turn is underlain by potentially soft and very compressible alluvial deposits of significant thickness as the evidence below suggests.

Anecdotal Evidence from Site Visit

Mark King (community centre staff) holds copies of reports on previous ground investigations which have already been completed at the site. Although it was not possible to look at these reports at the time of the site visit due to time constraints, Mark mentioned that the new community centre was piled to depths of approximately 20 to 30m below ground level where bedrock was encountered. Mark also mentioned that the community centre and surrounding owned land had been built up to alleviate waterlogged and 'boggy' conditions which are experienced in the central, pitch area of the playing field.

According to the Envirocheck report the following geological hazards are present on site:

- Moderate risk of compressible ground stability hazards
- A low risk of shallow mining hazards
- A very low risk of landslide ground stability hazards
- A very low risk of running sand ground stability hazards
- A very low risk of shrinking or swelling clay ground stability hazards
- A low to moderate risk of ground dissolution stability hazards
- There is the possibility for vadose caves (a cave that forms above the water table) and phreatic caves (a cave that forms below the water table) to be

present within the close vicinity of the site – probably within the limestone strata located south of the southern site boundary.

Constraints

Based on this initial review there are the following constraints to the disposition of the development with respect to geotechnical or geo-environmental conditions:

- The significant thickness of landfill material and alluvial deposits underlying the site combined with the anecdotal evidence available allude to the fact that it may be necessary to use pile foundations below the school (to depths of 20 to 30m bgl) which may prove prohibitively expensive.

- There is potential for methane gas to be generated by the alluvial deposits (and lesser extent overlying fill material) which may require remedial measures within any future development.

- The surrounding playing fields and pitches for proposed use by the school are relatively low lying and become waterlogged.

- Further information regarding the landfill may be required to confirm that it does not contain leachable of putrescible materials, or investigations required to determine potential migration

Stonehouse Creek Secondary School Feasibility Study

Flood Risk Scoping Report

Introduction

This scoping report has been prepared as part of a feasibility study for Stonehouse Creek Secondary School, Devonport. A brief assessment of flood risk has been undertaken to inform the necessary requirements for a full flood risk assessment (FRA) as outlined in Appendix F of Planning Policy Guidance 25. It also considers Draft Planning Policy Statement 25 that is due to be released in early October 2006 to ensure compatibility. This involved reviewing available information and initial contact with the Environment Agency. A site visit was conducted on 22nd September to provide further information in the preparation of this report.

Background

The proposed location for Stonehouse Creek Secondary School is situated to the east of Kings road and to the north of Stonehouse Bridge (A374). Prior to 1970, the land situated to the north of Stonehouse Bridge was a lake. This area has subsequently been in filled and is occupied by a community centre with playing fields to the north east and a car park to the south. Figure 1 illustrates the location of the site and its relation to areas identified using the Environment Agency indicative floodplain maps.

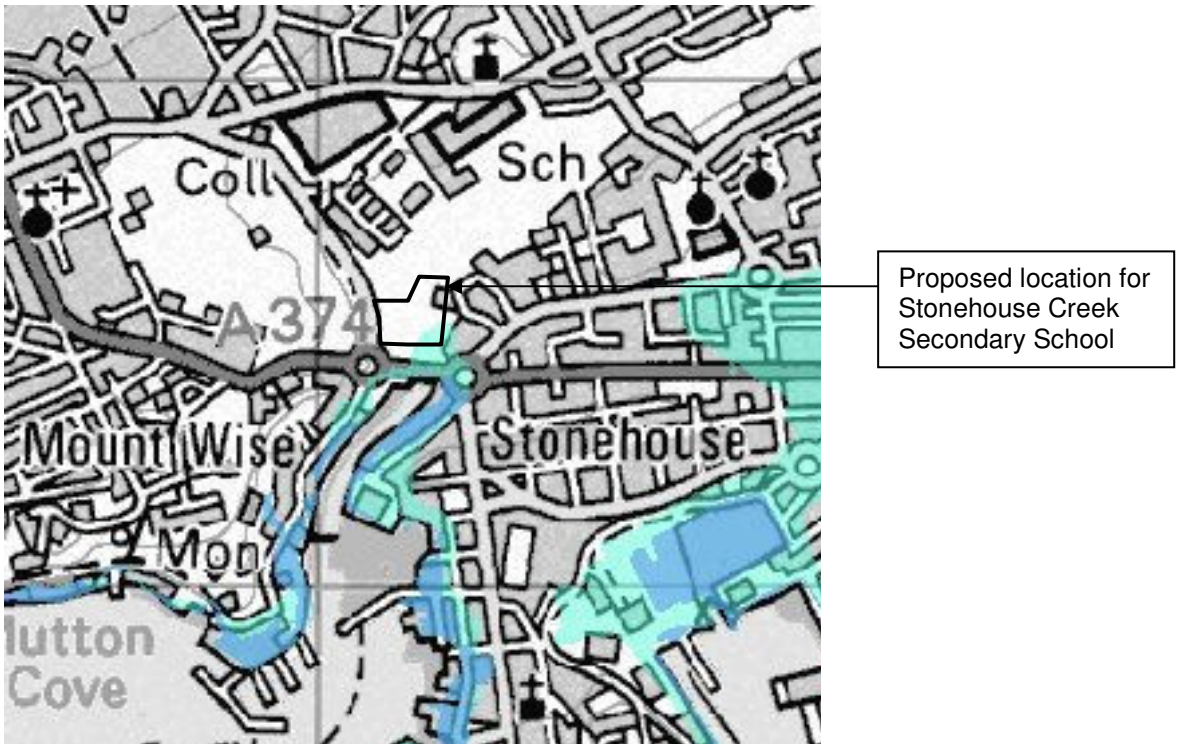

Figure 1: Proposed location for Stonehouse Creek Secondary School, note that areas of light blue are indicative of flood risk from extreme flooding from rivers and sea without defences.

Existing information

Initial contact with the Environment Agency has indicated that data are available with respect to historic flooding within the vicinity of the site. In addition, further information is available with regard to extreme tide levels and topographic data. The Environment Agency indicated that localised flooding is probably caused through inadequate sewer capacity and any planning application for this site would require a full flood risk assessment. These data would

need to be gained through a formal data request to the Environment Agency for compilation of a flood risk assessment.

The walkover survey indicated that the site slopes predominantly in an easterly direction, with the lowest areas experienced in the southeast. This confirms that the low lying area in the southeast corner is the most likely to be susceptible to flooding. No existing flood defences or flood alleviation measures were noted at the site. A discharge of water was noted to the south of Stonehouse Bridge indicating that watercourses beneath the ground surface drain the upstream catchment.

Liaison with the Stonehouse Community Centre Manager indicated that the low-lying playing field approximately 200m north east suffers surface water ponding during times of heavy rain. This is more prevalent when combined with high tides causing increased saturation of the underlying substrate. Further information is available from the Community Centre with respect to the centre's construction and the accompanying site investigation and drainage reports. This is not included in this report due to time constraints in obtaining this information.

Topographic data was identified from the planning application available from the Plymouth City Council Planning Department. This also confirms that the southeast corner of the site is significantly lower than the rest of the site with levels being approximately 3.5 m above Ordnance Datum (aOD) in this area.

Flood Risk and Planning Policy

Plymouth City Council has supplied the spatial extent of the proposed school; this is illustrated in Figure 1. This illustrates that the majority of the development will be situated in 'Flood Zone 1' as defined in PPS25. Flood Zone 1 corresponds to land that is assessed as having a less that 1 in 1000 chance (<0.1%) of river and sea flooding in any year and therefore a low probability of flooding. All development proposals within Zone 1 should have regard for:

- Vulnerability to flooding from other sources
- Potential to increase flood risk elsewhere through increased surface water runoff generated

In addition, it is necessary to seek opportunities to:

- Reduce flood risk through the layout and form of the development
- Mitigate potential increases in flood risk through the appropriate use of sustainable drainage SuDS techniques

However, a small portion of the site in the southeast is located within 'Flood Zone 2' as defined in PPS25 and confirmed through a Landmark Envirocheck. Flood Zone 2 corresponds to land assessed as having between a 1 in 100 and 1 in 1000 chance of river flooding (1% - 0.1%) and between 1 in 200 and 1 in 1000 chance of sea flooding (0.5%-0.1%) in any one year. All developments in Flood Zone 2 should be accompanied by a flood risk assessment and should have regard to:

- Vulnerability to flooding from other sources
- Vulnerability to flooding over life time of the development
- Potential to increase flood risk elsewhere through increased surface water runoff generated and the depth and speed of flooding to adjacent and surrounding property
- Residual risks of flooding after existing and proposed flood management and mitigation measures are taken into account

In addition, the same opportunities as identified for Flood Zone 1 should be sort to reduce flood risk and mitigate through the use of SuDS. Under PPS25, all major developments located within Flood Zone 1 require a flood risk assessment. A development for non-residential use is defined as 'major' if the floor space is equal or greater than 1000 m^2, or the

site area is equal or greater than 1 Ha. It is assumed that the floor area of the proposed secondary school will exceed 1000 m^2 and therefore a flood risk assessment would be required.

Recommendations

A full flood risk assessment would be required for the proposed development of Stonehouse Creek Secondary School, and should be submitted as part of a planning application. The FRA report would concentrate on the requirements of Appendix F of PPG 25. However the scope and level of detail of the assessment would also be influenced by further discussions with the Environment Agency. The objective of the report would be to satisfy the planning authority with respect to PPG25, although it will be influenced by the pending PPS25, through discussion with the Environment Agency.

This Flood Risk Assessment Report would include the following:

- A location plan showing existing site levels relative to Ordnance Datum.
- Details of existing flood alleviation measures.
- An assessment of the sources of possible flooding.
- Details of existing information on flooding and the allowance for the predicted effects of climate change.
- An assessment of the need for mitigation measures, such as raising of threshold levels, provision of flood storage, together with a review of the viability of these measures.
- An assessment of a possible dry access/ egress routes.
- An assessment of the potential impact of any development on fluvial morphology, and on adjacent areas.
- An assessment of drainage impacts, particularly whether there will be increased run-off and how this can be accommodated.

Topographic information either from the client or taken from an external mapping source would be used to determine the actual floodplain extent with regards to the proposed development boundaries and layout. If topographic data needs to be obtained from an external mapping source, this cost would be in addition to a proposed fee.

Exeter Archaeology notes:

The site lies within the ancient parish of Stoke Damerel. Stonehouse Creek was sometimes called Stonehouse Lake. The underlying geology comprises Upper Devonian Slates.

The English Heritage Listed Buildings entry for Stonehouse Bridge (Grade II) states it was built 1767–9. However, other sources maintain it was completed in 1773. Tolls were collected to recoup the cost of construction, including from foot passengers.

The bridge was widened and the abutments raised in *c*. 1828, and it was also widened for dual carriageways in *c*. 1966 when the parapet was replaced by railings and the north side was buried in earth.

Listed structures are statutorily protected and the impact of any development on the bridge and its setting will need to be taken into consideration.

The 19th-century historic maps show gradual reclamation and silting along the edges of the Creek. In the late 19th century the west side of the Creek just north of the bridge was used as a 'Timber Pond' (Map 3). The Creek in this area was gradually infilled after WWII.

The history and archaeology of Stonehouse (up to the late 1990s), which includes the area immediately to the north of the bridge, was summarised in Gardiner, J. (ed.) 2000 *RESURGAM! Archaeology at Stonehouse, Mount Batten, and Mount Wise Regeneration Areas, Plymouth*. In the 1990s eight boreholes were dug immediately north of Stonehouse Bridge in relation to a proposal to build a multi-storey car park. These provided a cross section across the former Creek The west bank was shown to have been steep-sided, with little weathered slate at the interface with the bedrock, and the east bank less so with considerable weathered slate intermixed with alluvial deposits. Slate bedrock was reached at depths of between 6.20m (-2.09m AOD) and 16.10m (-11.57m AOD), above which were deep deposits of silty clay alluvial beneath post-WWII rubble infill. No archaeological material was recovered apart from a single hazelnut 15m below ground level (Gardiner (ed.) 200, 47–9).

Apart from the boreholes (above) the nearest structured archaeological investigations took place in 1996 at Stonehouse Quay (SX 4627 5438). This was on land reclaimed from the former inter-tidal zone on the eastern side of Stonehouse Creek, to the south of Stonehouse Bridge, a site formerly occupied by buildings of the Stonehouse Brewery. There was good archaeological preservation on this site and stages of reclamation from the 16th century onwards were established (Exeter Archaeology Report No. 96.44). A useful pottery assemblage of both imported and local wares was also retrieved. This site, however, does not directly compare to the area north of the bridge because it contains earlier reclamation deposits on the Devonian Limestone.

NB. The 1525 bridge mentioned by John Salvatore (below) is Stonehouse Mill Bridge (the northernmost on shown on Maps 1 and 3).

Maps

1. **1820** Plan of the towns & harbour of Plymouth, Stonehouse, Dock, Morice-Town, Stoke and the environs. Engraved by John Cooke; surveyed, drawn and published by S. Elliott, 1820 (Westcountry Studies Library).

2. ***c*. 1856–7** 1:2500 Sheet 123.11 'military' version (Plymouth and West Devon Record Office). Probably surveyed *c*. 1856–7. Map embossed 1863 and stamped 'R E Office, Devonport 65'.

3. **1861–93** Admiralty Chart Plymouth Sound and Hams 21.8.1861 (revisions 1880, 1887, 1893) surveyed Cdr H.L. Cox, A.B. Usborne & J.E. Davis Masters R.N. (Plymouth City Museum).

4. **1907** OS 1:2500 Sheet 123.11, 1907.

J. Salvatore's notes

Stonehouse Creek, at the time that Stonehouse Bridge was completed in 1786, reached from the mouth of the creek at Stonehouse Pool (where the medieval town of Stonehouse was located on the east bank) back up as far as Pennycomequick. The creek was used for the transfer of wounded sailors by boat to the Royal Naval Hospital (at Millfields) where they were brought ashore at the jetty which still survives (Listed Building Grade II). The hospital itself was constructed in 1758.

A bridge across the creek had been constructed as early as 1525 by Sir Piers Edgcumbe to hold a mill driven by the waters of the creek; this bridge later became a toll bridge in 1807.

Across the creek from the Royal Naval Hospital, the Royal Military Hospital was built in 1797 and was also accessible by sea; it was later converted to a school in 1939. **Note that the Hospital/School is a Listed Building at Grade II* and as such any proposed development which affected its setting would require statutory consultation with English Heritage. The uninterrupted view across the creek to the arcaded south face of the hospital might be an area of concern for English Heritage should development be proposed in front of this.**

The school/hospital also lies within the boundary of the Stoke Conservation Area and the question of setting would also therefore be an issue with the council's planning consent officers.

Stonehouse Creek itself was tidal until WWII when it was dammed at the bridge to provide an emergency source of water. After the War rubble from the Blitz was tipped into the creek to form the level playing fields extending up to Millbridge.

There is unlikely to be any below ground archaeological interest in Stonehouse Creek (given the infilling) except at very great depths. However, given the likely concerns raised above re setting of the Grade II* building of the Royal Military Hospital, greater consideration should be given if possible to the siting of any proposed development within Stonehouse Creek at the Stonehouse Bridge end of the creek where the issues of setting will not be as severe.

Plymouth City Council

Stonehouse Creek School

Preliminary Utilities Scoping Report

25th September 2006

Plymouth City Council
Stonehouse Creek School
Preliminary Utilities Scoping Assessment

Report compiled by: D Allport

Record of revisions

Version	Date	Prepared	Reviewed	Approved	Revision Description
Preliminary	25/09/06	DA	CJT	CJT	
Final					
Revision					
Job Number:	D113635		Document Number:		D113635/UA01

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Checked by Date: 25 September 2006

Approved for issue Date: 25 September 2006

Plymouth City Council
Stonehouse Creek School

Preliminary Utilities Scoping Assessment

CONTENTS

1 INTRODUCTION

Plymouth City Council propose to include a secondary school in Stonehouse, Plymouth near the junction between Stonehouse Bridge and Kings Road as part of the Approved Action Plan. Initial estimates are that the school will cater for 1900 pupils.

LDA in association with Scott Wilson have been appointed by Plymouth City Council to conduct a high level appraisal of the feasibility of the development proposal. This utilities scooping report comprises one component of the of the feasibility appraisal.

An outline assessment of the utilities in the vicinity of the Stonehouse site has been carried out. This involved approaching the main local utility providers (gas, water and sewerage and electricity) to ascertain the extent and capacity of their respective supplies in the locality of the site. Letters were sent to; Wales and West Utilities; Western Power Distribution and South West Water on 21st September 2006 requesting existing services plans and confirmation of local network capacity. This is a preliminary report and not all information has been received from the relevant suppliers at this stage.

2 GAS

A response from Wales and West had not been received at the time of this report. A plan showing the existing gas mains network in the vicinity of the site, downloaded from the Wales and West Utilities website for a previous project on 6 July 2006, was retrieved from the Scott Wilson records. A copy of the downloaded plan has been included in Appendix A.

The plan shows a 6" clay, low pressure main running along Kings Road. Smaller low pressure mains are shown in Waterloo Court and Waterloo Yard to the east of the site. Private gas supplies are indicated on the plan.

On the basis of recent enquiries made to Wales and West Utilities for nearby development projects within the Devonport area, reinforcement of the existing gas supply network may be required in order to accommodate the new school.

3 ELECTRICITY

Plans from Western Power Distribution, showing the extent of their services in the locality of the site, were received on 25th September 2006. The plans are included in Appendix B.

To the west of the site, along King Street, there is an underground 11kV cable running the entire length of the site and an underground low voltage cable that runs to the community centre from the north.

A number of cables run across Stonehouse Bridge to the south of the site. These include a low voltage underground cable on the north side of the road and the 11kV cable on the south side, as well as service cables and street lighting along the centre of the road.

To the east of the site there is a 132kW cable running between Waterloo Court and the car park south of the Waterloo Flats.

There are electrical substations on Waterloo Close, to the east of the site, and at the junction of Kings Street and Corea Terrace (approx 260m northwest of the site).

There is an existing low voltage underground main to the site which terminates at the north of the existing carpark, as well as one to the community centre.

There are PME earths in the community centre and two in nearby Waterloo Court.

A reply regarding the capacity of the existing network from Western Power Distribution is still awaited.

4 WATER AND SEWERAGE

Plans showing the extent of the water mains and drainage network around the site were downloaded from the South West Water website on 25th September 2006 (included in Appendix C). The South West Water plans do not show private services.

A letter was sent to South West Water on 21st September 2006 to establish whether the existing distribution mains and drainage services in the area have sufficient capacity to accommodate the secondary school. A reply is awaited.

Mains (Potable) Supply

A 6" concrete water main runs across Stonehouse Bridge fed from a 9" asbestos cement main running along Kings road. The residential areas to the east of the site, Waterloo Court/Waterloo Yard Flats are supplied by a network of 3" and 4" asbestos cement mains.

Drainage

Two combined sewers run across the proposed site to the north of the existing car park. The depth, size and capacity of these sewers are not known, they could require diverting depending on the plan of the proposed school. A third combined sewer, 1150mm diameter precast concrete, runs along the east of the site through Waterloo Court and cuts across the south east corner of the site.

There is a 600mm diameter storm drain just north of the proposed site but it is unclear what this drain connects to. A 225mm diameter vitrified clay storm water drain runs from the west and discharges in to Stonehouse Pool at the western edge of Stonehouse Bridge. A short run of storm drain discharges road run off in the Stonehouse Pool at the eastern edge of Stonehouse Bridge.

5 CONCLUSION

Plans of the existing services in the area have been obtained. Two combined sewers are the only services that cross the site that may need diverting to accommodate the proposed school development.

There are a number of low pressure gas mains near the site and we are awaiting confirmation from Wales and West of whether there is sufficient capacity in the local network.

There is an existing low voltage electrical connection to the site and both 11kV and 132kV cables in the area as well as two substation within 300m of the site. We are awaiting confirmation from Western Power Distribution of whether there is sufficient capacity in the local network.

There are potable water mains in both Kings Road and on Stonehouse Bridge. We are awaiting confirmation from South West Water of whether there is sufficient capacity in the local network.

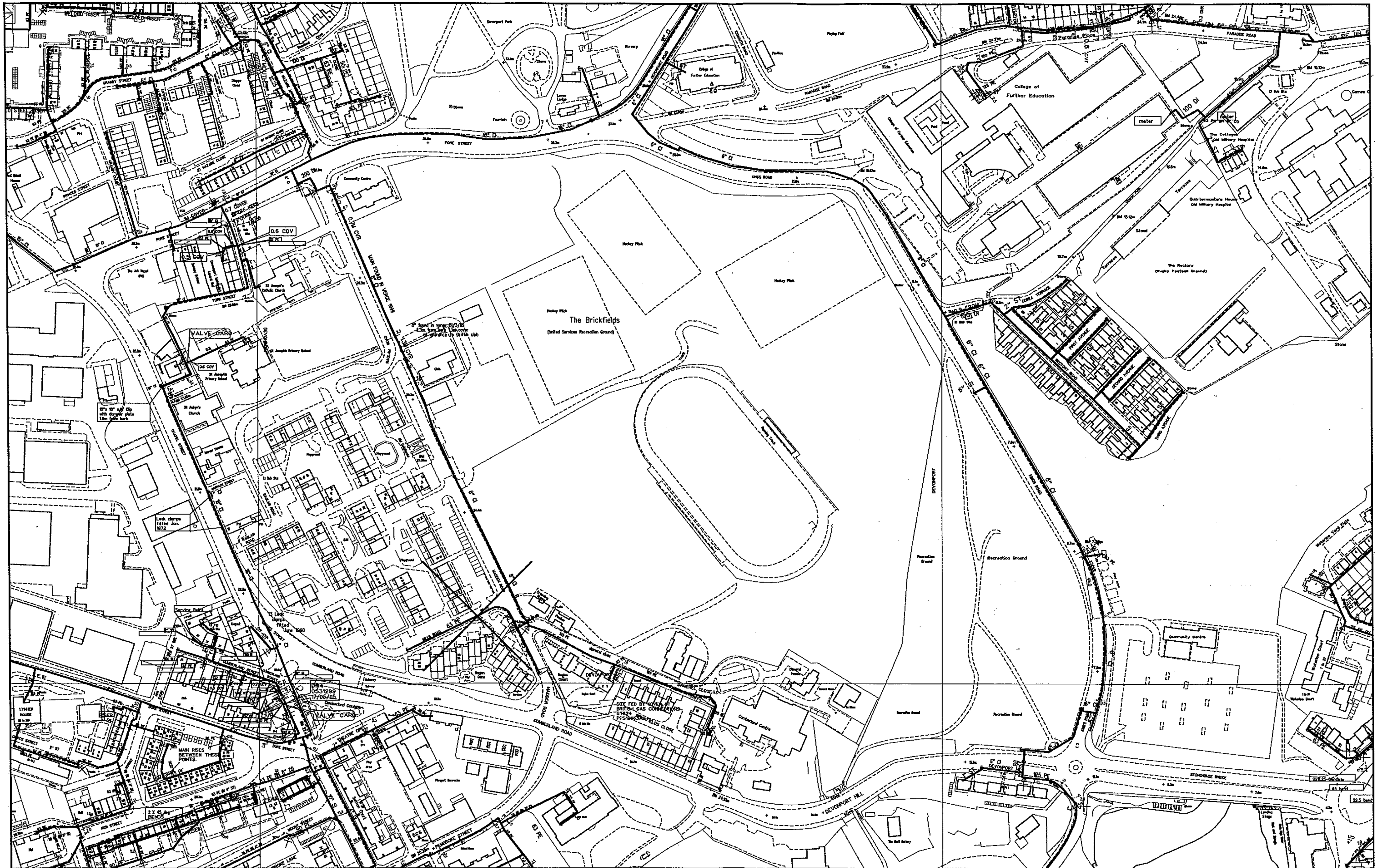
There are three combined sewers in the vicinity of the site. We are awaiting confirmation from South West Water of whether there is sufficient capacity in the local network.

Subject to approval of the EA the storm drainage may be able to be attenuated and then discharged directly into Stonehouse Pool. If this is not acceptable there is storm drain to the north of the site although the details are currently unknown.

6 APPENDICES

APPENDIX A

Wales and West Utilities Service Plans



SCALE: Not to scale	LP MAINS
USER ID: 92227nt	MP MAINS
DATE: 06/07/2006	IP MAINS
EXTRACT DATE: 10/03/2006	LHP MAINS
MAP REF: SX4554	NHP MAINS
CENTRE: 245816, 054681	

Some examples of Plant Items: Valve, Depth of Cover, Syphon, Diameter Change, Material Change

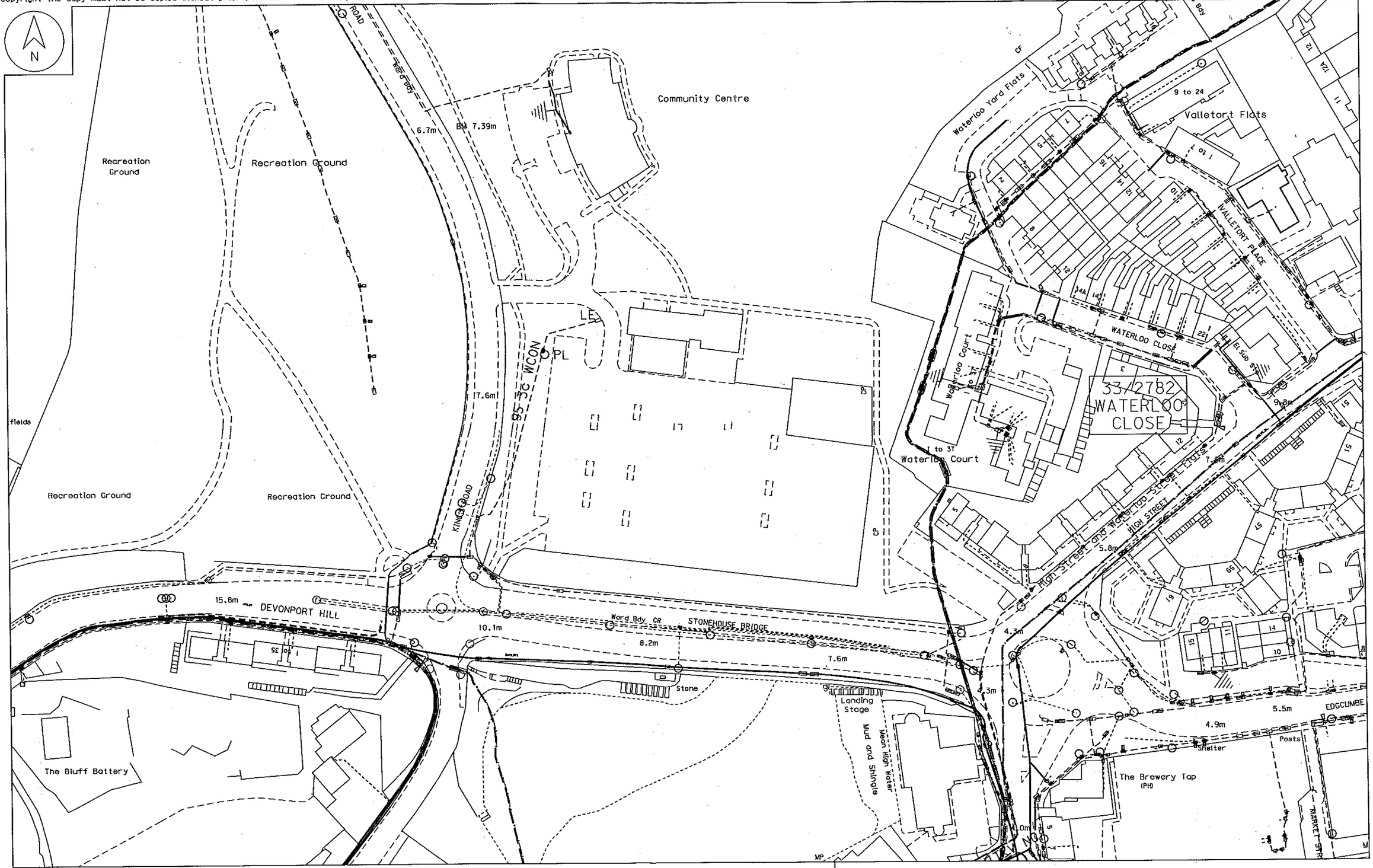
MAPS Viewer Version 5.0.11.0

Local Machine

APPENDIX B

Western Power Distribution Service Plans

PLEASE NOTE: This plan ONLY shows assets owned by Western Power Distribution. Electricity assets owned by IDNO's (Independent Network Operators) MAY be present in this area.



SURF TELECOMS APPARATUS
S——S——S

PILOT CABLES
P——P——P

OVERHEAD LINE
LV
11kV
33kV/66kV
132kV

UNDERGROUND CABLE

PME Earth

Underground Earth

Pole Mounted Transformer

Ground Mounted Transformer

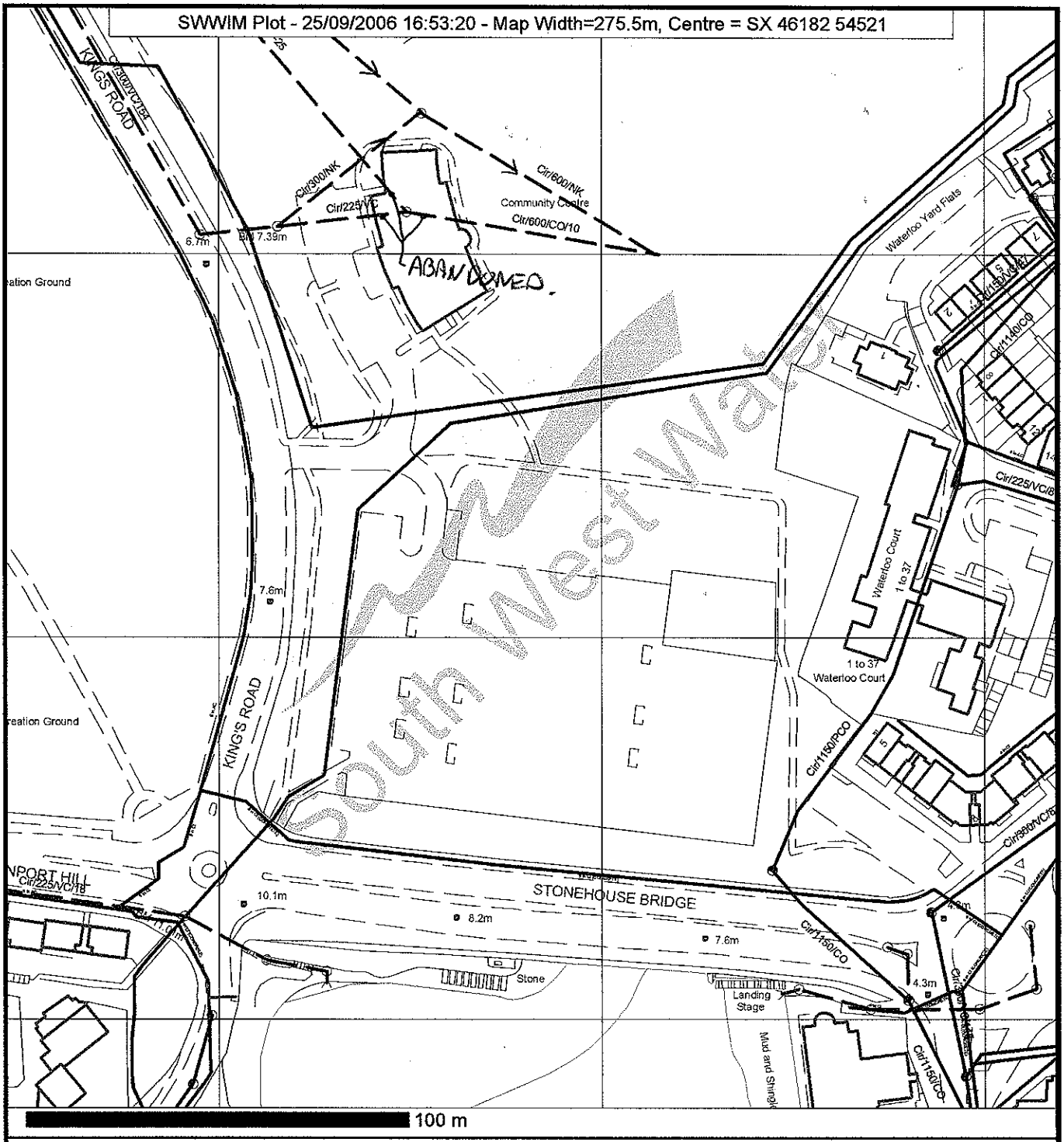
✳ ADVICE SHOULD BE SOUGHT FROM THE MAPPING CENTRE IN EXETER FOR ANY WORK THAT IS TO TAKE PLACE IN PROXIMITY TO 132kV UNDERGROUND CABLES AND 132kV OVERHEAD LINES

DATE: 21-9-2006
SCALE 1: 1250
REPLY BY: Ivan Heeley
OUR REF: 67177/1
MAP REF: SX4654SW

WESTERN POWER DISTRIBUTION
Serving the South West and Wales

APPENDIX C

South West Water Service Plans



SOUTH WEST WATER

Ordnance Survey®

www.ordnancesurvey.co.uk

THE INFORMATION CONTAINED WITHIN THIS MAP SHOULD NOT BE USED FOR ANY PURPOSE OTHER THAN AS A GENERAL GUIDE TO THE LOCATION OF EXISTING SERVICES.

PLEASE REFER TO WATER AND SEWER LEGENDS FOR CONFIRMATION OF ASSET DETAILS.

THIS PLAN MUST NOT BE USED AS PART OF A CONVEYANCING DOCUMENT FOR PROPERTY PURCHASES.

The position & depth of apparatus and other information indicated on this map is provided as a general guide only and no assurance or warranty as to its correctness or accuracy is given or should be inferred.

Exact positions & depths should be obtained by excavation trial holes and the map must not be relied on in the event of excavation or other works undertaken or planned in the vicinity of the Company's apparatus.

Please note that not all mains, service pipes and other apparatus of the Company in the area of the plan are shown.

Water Colour Codes and Abbreviations

Examples of the abbreviation details above a Water Pipe (details will be in the same colour as the pipe itself):

A B
3 in CI

A: Size
B: Material Abbreviation

Distribution Main		Untreated Main	
Trunk Main		Private Pipe	
Communication Pipe		Abandoned Main	

Cast Iron CI	Spun Iron SI	Ductile Iron DI	Steel ST
Asbestos Cement AC	Plastic UPVC	High Density/ Medium Density Polyethylene HDPE MDPE	High Pressure Polyethylene HPPE

Water Features (shown in common colours)

Washout	Hydrant	Hatchbox	Washout Hydrant
Air Valve (Single)	Air Valve (Double)	Closed Valve Closing Direction: Anti-Clockwise	Closed Valve Closing Direction: Clockwise
Pump	Pumping Station Number of Pumps as indicated 2	Open Valve Opening Direction: Anti-Clockwise	Open Valve Opening Direction: Clockwise
Customer Meter C	EBCO M optional if meter fitted EBCO	Non-Return Valve /Reflux	Stoptap
Mains Meter M M=Normal DMA/WIS B=Boundary Meter; 1010 Optional Readout if location is different from the meter		Relief Valve	End Cap
		Inlet / Outlet	Pipe Reducer
Pressure Reducing Valve	Pressure Sustaining Valve	Abstraction Point AB	Bore Hole BH

Water Pipe Furniture

Anode A	Calgon / Aquarite C/A	Chlorination Point C	Flushing on a Sluice Valve F
Insert IFM	Excavation		

Sewerage Pipe Details

Examples of the abbreviation details above a Sewer Pipe (details will be in the same colour as the pipe itself):

A: Shape
B: Diameter (replaced by width & length on non-circular pipes
C: Material
D: Gradient (1: number shown)

A B C D
Cir / 225 / VC / 82

Public - Foul

Public - Surface

Public - Combined

Public - Treated

Private Sewer

Unverified

Highway

Abandoned Sewer

Pumping Main

/EL
Elevated Sewer

Syphon

Shapes

Circular	Cir	Rectangular	Rec	Barrel	Brl	Trapezodial	Trpz
U Shaped	UShp	Horseshoe	Hsho				

Materials

Vitrified Clay	VC	Clay (Salt Glaze)	SG	Pre-cast Concrete	PCO	Concrete	CO
Asbestos Cement	AC	Brick	BR	Stone (Masonry)	MAC	Alkathene	AK
Steel	ST	Concrete Box	CB	Glass Reinforced Plastic	GRP	Plastic	PL
Polypropylene	PP	Unplasticised Polyvinylchloride	UPVC	Polyethylene	PE	Polyvinylchloride	PVC
Concrete Segments Bolted	CSB	Pitch Fibre	PF	Concrete Segments Unbolted	CSU	Medium Density Polyethylene	MDPE
Not Known	NK						

Sewerage Structures (shown in common colours)

Manhole Foul / Trade	Manhole Surface	Manhole Private	Manhole Combined
Soakaway SK	Washout WO	Catchpit CP	Hatchbox HB
Flushing FC	Lamphole LH	Tank Online TN	Tank Offline TO
Septic Tank S	Cesspit C	Header E	Drain LD
Reflux Valve RV	Sluice Valve	Air Valve AV	Venting Pole VP
Storm Overflow SO		Undefined Connection	Side Entry
Outfall OF		Backdrop	

Sewerage Installations

Pumping Station	Treatment Works WWTW

Details on Covers

Lockable k	Gas / Water Tight t	Bolted b

Location

Buried BL	Unable to Locate UL

BRIEFING NOTE

Job Title:	Stonehouse Creek
Job Number:	
Author:	Jon Dare-Williams
Date:	27/09/06
File Reference:	

This note has been prepared to provide guidance on the potential development of a Secondary School on the Stonehouse Creek site. It is understood that the school will accommodate around 1,900 pupils and require approximately 15,000 m^2 of buildings.

This note considers access and parking.

Access

Access to the school by all modes of transport will be important. With the level of proposed development in the Devonport and Millbay area traffic is predicted to increase above levels that would normally be expected. It is understood that the proposed level of development will put increasing pressure on the Stonehouse Bridge roundabout and that this will need to be improved. Accordingly, encouraging pupils to walk, cycle and take the bus to school should be a key consideration of the development of the site.

Pedestrian and cycle permeability should be high on the agenda in the development of the Masterplan. In particular, access should be available from the east and west sides of the site and consideration given to links across the fields to the north.

It would appear appropriate to use the existing community centre access onto Kings Road as the vehicular access to the development. This access is currently a three-arm give-way junction. The access is located away from existing residential areas, which reduces 'nuisance' associated with the school run on local residents.

The increase in traffic movements associated with this access will need to be assessed in more detail should the proposal be pursued. At this stage, it is considered that this access could provide adequate capacity for the school.

Parking

The site is located on an existing area of informal land. This has the appearance of a car park and it is understood that this is not formally associated with any local buildings (such as the community centre) and may be for activities associated with the filed to the north. It is also understood that car boot sales have taken place on the site.

Kings Road will become busier with proposed development and care needs to be taken in accommodating 'kiss and ride' activity associated with the school. Kings Road is wide enough to accommodate some parking along its length although it is likely that a lot of this will be taken up by pupils at the College of Further Education.

The local maximum car parking standard for the secondary school (from the emerging policy) requires 1 space per teacher and 1 space per classroom (for staff and visitors). There is no allowance for pupils. The car parking requirement can then be estimated using knowledge of the school requirements.

An assessment of likely parking demand based upon the understood requirement for a 1,900 pupil school and using information from the TRICS[1] database it is estimated that the following parking levels will be required:

- The average pupil/ staff ratio is 0.1 staff per pupil
- The average car park space/ pupil ratio is 0.8 spaces per pupil which equates to 143 spaces
- Based upon an approximate requirement of 20 m^2 per space this requires approximately 2,860 m^2 allocated for parking.

[1] Transport Planning database including a number of secondary school sites throughout the country (details attached).

Stonehouse Creek Secondary School. Research

Description	Area	GFA	PUPILS	SPACES	EMPLOY
SECONDARY SCH., WORKINGTON	CUMBRIA	8450	861	97	75
SECONDARY,ST AUSTELL	CORNWALL	10307	1114	50	64
SECONDARY, WEYMOUTH	DORSET	12304	1201	110	125
SECONDARY SCH, WEYMOUTH	DORSET	5486	766	60	70
SECONDARY SCHOOL, PORTLAND	DORSET	7955	802	42	81
SECONDARY SCH., SHERBORNE	DORSET	10272	1327	142	130
SECONDARY SCH., COLCHESTER	ESSEX	9304	927	57	103
SECONDARY,METHIL	FIFE	17500	1559	105	177
SECONDARY SCHOOL, FULHAM	GREATER LONDON	7350	610	40	62
SECONDARY,WINCHESTER	HAMPSHIRE	6994	1045	45	99
SECONDARY,PORTSMOUTH	HAMPSHIRE	9599	966	50	96
SECONDARY, NEW ALRESFORD	HAMPSHIRE	6730	634	64	46
SECONDARY SCHOOL, ANDOVER	HAMPSHIRE	8224	895	41	78
SECONDARY SCHOOL, ALTON	HAMPSHIRE	5600	717	52	68
SECONDARY SC, WATERLOOVILLE	HAMPSHIRE	13882	1780	182	189
SECONDARY SC,NEW ALRESFORD	HAMPSHIRE	8200	885	100	111
SECONDARY SCHOOL, PRESTON	LANCASHIRE	7650	793	62	55
SECONDARY SCHOOL, LINCOLN	LINCOLNSHIRE	12496	1200	100	140
SECONDARY SCHOOL, OXFORD	OXFORDSHIRE	6040	1069	71	111
SECONDARY SCHOOL, STOKE	STAFFORDSHIRE	8970	758	50	50
SECONDARY SCH, BIRMINGHAM	WEST MIDLANDS	6000	600	54	68
SECONDARY, LITTLEHAMPTON	WEST SUSSEX	7232	1001	44	75
		Total	**21510**	**1618**	**2073**

Employees per pupil	0.10	
Spaces per pupil	0.08	
Therefore for		1900 pupils
	requires	183 staff
	requires	143 spaces

Appendix 3

Key Formulae for Middle Deemed Secondary and Secondary Schools

N = number of pupil places

Minimum Building Areas	9–13 middle schools	11–16 secondary schools	11–18 secondary schools
basic teaching	50 + 2.5N	50 + 3N	200 + 3.06N
halls	250 + 0.3N	600 + 0.3N	600 + 0.3N
learning resources	50 + 0.2N	75 + 0.25N	125 + 0.29N
staff and administration	75 + 0.24N	125 + 0.3N	125 + 0.31N
storage	100 + 0.29N	175 + 0.35N	200 + 0.36N
dining and social	25 + 0.1N	25 + 0.2N	100 + 0.26N
'float'	150 + 0.17N	250 + 0.3N	250 + 0.32N
TOTAL NET BUILDING AREA	**700 + 3.8N**	**1300 + 4.7N**	**1600 + 4.9N**
LIKELY GROSS BUILDING AREA	**1000 + 5.4N**	**1850 + 6.7N**	**2250 + 7N**

Minimum Site Areas	All middle schools and secondary schools (except confined sites)	Middle and secondary schools in confined sites
pitches	10000 + 35N	provided 'off-site'
soft informal and social	800 + 2.5N	600 + 2.5N
games courts (hard surfaced)	600 + 2N	2000 (MUGA)
hard informal and social	400 + 1.5N	200 + 1N
habitat	200 + 1N	0.5N
'float'	1000 + 5N	remainder of site
TOTAL NET SITE AREA	**13000 + 47N**	**2800 + 4N minimum**
LIKELY SITE AREA: from	**14000 + 52N**	**4000 + 5N**
to	**16000 + 59N**	**5000 + 6N**

These formulae are the basis of the graphs later in the document. They can be used for schools where there are (approximately) the same number of pupils in each year up to Year 11. Gross area figures are approximate to allow an easy 'rule of thumb'. The stay-on rate is assumed to be 62.5% in the 11-18 schools. If the number of pupils in each year is not the same or the sixth form stay-on rate is different, the table below should be used to determine the correct formula.

Key Formulae for Calculating Building Area for Any Secondary School (except special)

	Area for each school:			Area for each pupil in:			
Minimum Building Areas	For any middle school	For any secondary school	Extra for any sixth form	KS 2	KS 3	KS 4	post-16
basic teaching	50	50	150	2.1	2.9	3.15	3.3
halls	250	600	–	0.3	0.3	0.3	0.3
learning resources	50	75	50	0.15	0.25	0.25	0.45
staff and administration	75	125	–	0.2	0.28	0.33	0.35
storage	100	175	25	0.25	0.33	0.38	0.4
dining and social	25	25	75	–	0.2	0.2	0.5
'float'	*150*	*250*	–	*0.1*	*0.24*	*0.39*	*0.4*
TOTAL NET BUILDING AREA	**700**	**1300**	**300**	**3.1**	**4.5**	**5.0**	**5.7**