

Comet Hotel, Hatfield.

Flood Risk Assessment

Curtins Ref: ICBR0037-RP-001

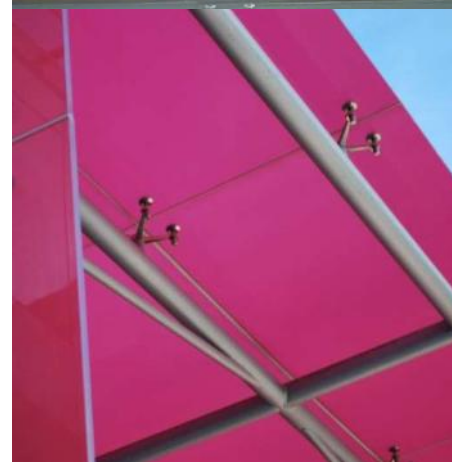
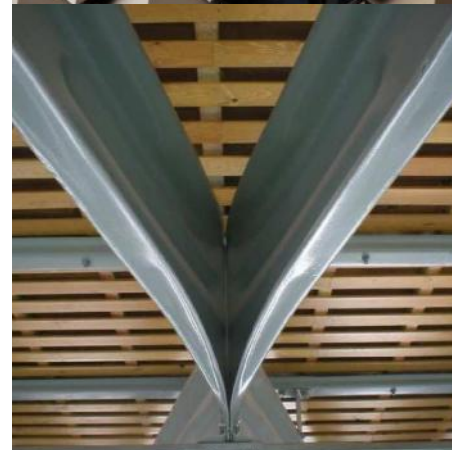
Revision: 03

Issue Date: 19 August 2016

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Rev	Description	Issued by	Checked	Date
00	First draft	AH	SW	04/09/2015
01	Amended to suit comments	AH	TN	25/09/2015
02	Amended to suit consultation comments	AH	TN	13/11/2015
03	Amended to suit latest development proposals	LR	SW	19/08/2016

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1.0 Introduction

1.1 Project Background

Curtins Consulting Limited has been appointed by Fusion Hatfield Hotels Ltd to prepare a site specific Flood Risk Assessment and Drainage Strategy (FRA) in support of the planning application for the re-development of the site at Comet Hotel Site, Hatfield.

This report is based on currently available information and pre-planning discussions.

Proposals contained or forming part of this report represent the design intent and may be subject to alteration or adjustment in completing the detailed design for this project. Where such adjustments are undertaken as part of the detailed design, and are deemed a material derivation from the intent contained in this document, prior approval shall be obtained from the relevant authority in advance of commencing such works.

Where the proposed works, to which this report refers, are undertaken more than twelve months following the issue of this report, Curtins Consulting shall reserve the right to re-validate the findings and conclusions by undertaking appropriate further investigations at no cost to Curtins Consulting.

1.2 Scope of Flood Risk Assessment

The assessment has been undertaken in accordance with the standing advice and requirements of the Environment Agency for Flood Risk Assessments as outlined in the Communities and Local Governments Technical Guidance to the National Planning Policy Framework (NPPF). The Lead Local Flood Authority (LLFA) Summary Guidance for developers - Management of Surface Water Drainage, by Hertfordshire County Council has also been referred to in producing this report.

The assessment has:

- Investigated all potential risks of current or future flooding to the site;
- Considered the impact the development may have elsewhere with regards to flooding risk;
- Considered design proposals to mitigate any potential risk of flooding determined to be present; and
- Considered design proposals for storm water drainage of the site.

2.0 Existing Site Details

2.1 Location and Description

The application site is situated approximately 1.5km from Hatfield town centre, on the corner of the A1001 Comet Way, the A1057 St Albans Road West and the A1 (M) being located just 125m east of the site.

The land identified as the Comet Hotel Site is a broadly triangular 1.56 hectare plot with access off both the A1057 St Albans Road West and the A1001 Comet Way. The site is bound to the north by St Albans Road West, in the south and east by A1001 Comet Way and the west by rear gardens of houses on Selwyn Crescent.

The site currently comprises of an existing 128 bedroom hotel and conference centre with car parking, access roads and other informal hard standings.

A site location plan with site boundary is included in [Appendix A](#).

2.2 Topography

A topographical survey has been provided within this document. The survey shows the site being relatively flat in nature with ground levels around the main building being circa 78.30mAOD with the FFL being circa 78.50mAOD. The ground levels fall towards the building in the north and west but away from the building in the south and east. The site has a low point located in the south-west corner at circa. 76.60mAOD; an embankment then raises levels up to meet Comet Way, which is at circa 80.90mAOD.

There are no ordinary watercourses or main rivers noted as running through the site.

The topographical survey drawing is contained within [Appendix B](#).

2.3 Existing Watercourses

The nearest ordinary watercourse to the site is Ellen Brook a tributary of the River Colne which is located approximately 450m south-west of the site. The River Colne is identified as a main river.

As the watercourse is not within riparian extents, further consideration will be required of the viability for providing a connection to the watercourse. As the watercourse is not a main river the Environment Agency has not been consulted at this stage. However Hertfordshire County Council, as the Lead Local Flood Authority has been consulted, who have provided their guidance on the production of Flood Risk Assessments.

2.4 Phase 1 Desktop Study

A Phase 1 desktop study has been carried out by Curtins' Geo-environmental department, which assess the geology, hydro-geology and historic land uses of the development site.

The Phase 1 desktop study identifies that the geology beneath the development site comprises of the Kesgrave Catchment sub-group of superficial deposits, consisting of sands and gravels above; Lewes Nodular Chalk Formation and Seaford Chalk Formation – Chalk, bedrock material.

Historical British Geological Survey data shows borehole data of the site and indicates a mixture of geology. The eastern boundary is made up of up to 2m of made ground over an unproven thickness of up to 8m of superficial deposits, sand and clay. A further borehole to the north west of the site reveals a 25m thickness of superficial deposits above the underlying chalk bedrock.

The hydrogeology data within the desktop study indicates the site is underlain by a Principal Aquifer within the superficial deposits layer and a Secondary A Aquifer within the bedrock material. A Principal Aquifer is geology which supports high level of water storage and a Secondary A Aquifer is geology which supports low-moderate volumes of groundwater storage.

However the site is over a Source Protection Zone 2 and 3 for its groundwater, where the groundwater beneath the site is protected for abstraction and human consumption. It is likely that any surface water runoff entering the ground through infiltration will require water cleansing prior to discharge. This can be provided through a min. 500mm thick layer of granular filter material beneath soakaway tanks.

2.5 Phase 2 Intrusive Ground Investigation

Further to the Phase 1 desktop study and the production of the initial Flood Risk Assessment submitted with the planning permission, a Phase 2 Intrusive ground investigation was carried out, including infiltration testing. Originally it was requested that the infiltration testing should be carried out in accordance with BRE 365, whereby trial pits would be dug, filled with water and then water depths recorded; however land sensitive issues arose which restricted trial pitting exercises from being carried out on site. Instead falling head tests were carried out at two borehole locations on site and the geological composition and falling head test results were assessed to prove if infiltration would be viable.

The geology through the site varied in depth of dense Clay above varying thicknesses of compacted sands and gravels. Infiltration test results proved very low in CP1 and non-existent in CP2. Groundwater was found at a depth of 7.9mbgl. The typical geology and the poor falling head test results determined the use of soakaways on site as a point of surface water discharge would not be viable for this scheme.

Extracts from the Phase 2 Ground Investigation can be found in [Appendix H](#).

2.6 Public Drainage

A Commercial DW Property Searches report was received from Thames Water dated November 2013.

The Thames Water searches report identified no public sewers, foul, surface or combined water directly crossing the development site. However recent changes in legislation transferred laterals from private properties to Thames Water and as such any drainage lateral from the site into the Thames Water public sewers may now be under their ownership and responsibility.

The Thames Water Asset location plan provided within the report identified the location of two public foul water sewers within St Albans Road West, to the north of the development site, one heading east and one heading west, both within the southern lane of the carriageway.

Foul water manholes 1301 and 2301 are shown to be located within St Albans Road West, opposite the site entrance and cover and invert levels have been provided. Manhole 1301 has a cover level of 78.33 and an invert level of 76.4, whereas manhole 2301 is shown to have a cover level of 78.36 and an invert level of 75.74. Both invert levels will need confirming prior to proposed drainage connection works proposed by the scheme.

Both manholes are identified as being heads of the runs they serve and the pipes that drain away from them are both shown to be 150mm in diameter. Referring the levels information provided in the report, both pipe runs appear to have been laid at the minimum gradients to achieve self-cleansing velocity. Based upon these gradients the sewers will have a capacity of 13l/s each. However the exact invert levels and pipe gradients will need to be confirmed on site prior to drainage connection works commencing.

The Commercial DW report identifies that surface water from the development discharges to a public sewer but has not provided details of which manholes the site connects to. A review of the level information for the public manholes within the Commercial DW report suggests that the nearest public surface water sewer within Mosquito Way, would not permit a gravity sewer connection from the site's existing surface water systems. It is likely that the surface water currently discharges to the foul sewer.

Based upon the existing hotel complex having 128 No. 3* bedrooms with an average of 2 persons a room, applying 250l/p/d allowance for foul water flows, and assuming a 12 hour working day, the existing hotel and conference complex develops average flows of 1.84 l/s and peak flows of 11.04 l/s. Neither of the existing foul sewers could solely accommodate the foul flows from the development; however it is suggested that foul flows are spread between both public foul sewers.

A copy of the Thames Water Commercial DW report is found in [Appendix C](#).

2.7 Private Drainage

Information shown on the topographical survey confirms the presence of private drains, likely to be combined water, within the site. The drainage picks up both rainwater downpipes from the outside and

the soil outlets from the internal arrangement, running along the outside of the building. The combined drainage then discharges to the public foul water sewers within St Albans Road West roughly in line with the site's entrance.

A copy of the topographical survey is found in [Appendix B](#).

3.0 National Planning Policy Framework

3.1 National Planning Policy Framework

In March 2012 the Department of Communities and Local Government published the National Planning Policy Framework document (NPPF) which provides guidance on how flood risk should be assessed during the planning and development process. The main Framework is supplemented by a technical guidance document ("Planning Practice Guidance" - PPG) which advises specifically with respect to flooding. The most critical aspects are extracted below.

3.2 Flood Zone Classification (Table 1)

Flood Zone	Definition
Zone 1 Low Probability	Land having a less than 1 in 1,000 annual probability of river or sea flooding. (Shown as 'clear' on the Flood Map – all land outside Zones 2 and 3)
Zone 2 Medium Probability	Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or Land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding. (Land shown in light blue on the Flood Map)
Zone 3a High Probability	Land having a 1 in 100 or greater annual probability of river flooding; or Land having a 1 in 200 or greater annual probability of sea flooding. (Land shown in dark blue on the Flood Map)
Zone 3b The Functional Floodplain	This zone comprises land where water has to flow or be stored in times of flood. Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency. (Not separately distinguished from Zone 3a on the Flood Map)

3.3 Flood Risk Vulnerability Classification (Table 2)

Essential Infrastructure

- Essential transport infrastructure (including mass evacuation routes) which has to cross the area at risk.
- Essential utility infrastructure which has to be located in a flood risk area for operational reasons, including electricity generating power stations and grid and primary substations; and water treatment works that need to remain operational in times of flood.
- Wind turbines.

Highly Vulnerable

- Police stations, ambulance stations and fire stations and command centres and telecommunications installations required to be operational during flooding.
- Emergency dispersal points.
- Basement dwellings.
- Caravans, mobile homes and park homes intended for permanent residential use.
- Installations requiring hazardous substances consent. (Where there is a demonstrable need to locate such installations for bulk storage of materials with port or other similar facilities, or such installations with energy infrastructure or carbon capture and storage installations, that require coastal or water-side locations, or need to be located in other high flood risk areas, in these instances the facilities should be classified as “essential infrastructure”).

More Vulnerable

- Hospitals.
- Residential institutions such as residential care homes, children’s homes, social services homes, prisons and hostels.
- Buildings used for dwelling houses, student halls of residence, drinking establishments, nightclubs and hotels.
- Non-residential uses for health services, nurseries and educational establishments.
- Landfill and sites used for waste management facilities for hazardous waste.
- Sites used for holiday or short-let caravans and camping, *subject to a specific warning and evacuation plan.*

Less Vulnerable

- Police, ambulance and fire stations which are not required to be operational during flooding.
- Buildings used for shops, financial, professional and other services, restaurants and cafes, hot food takeaways, offices, general industry, storage and distribution, non-residential institutions not included in “more vulnerable”, and assembly and leisure.
- Land and buildings used for agriculture and forestry.
- Waste treatment (except landfill and hazardous waste facilities).
- Minerals working and processing (except for sand and gravel working).
- Water treatment works which do not need to remain operational during times of flood.
- Sewage treatment works (if adequate measures to control pollution and manage sewage during flooding events are in place).

Water Compatible

- Flood control infrastructure.
- Water transmission infrastructure and pumping stations.
- Sewage transmission infrastructure and pumping stations.
- Sand and gravel working.
- Docks, marinas and wharves.
- Navigation facilities.
- Ministry of Defence installations.
- Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location.
- Water-based recreation (excluding sleeping accommodation).
- Lifeguard and coastguard stations.
- Amenity open space, nature conservation and biodiversity, outdoor sports and recreation and essential facilities such as changing rooms.
- Essential ancillary sleeping or residential accommodation for staff required by uses in this category, *subject to a specific warning and evacuation plan.*

3.4 Flood Zone and Flood Risk Vulnerability Compatibility (Table 3)

Flood Zones	Flood Risk Vulnerability Classification				
	Essential infrastructure	Highly vulnerable	More vulnerable	Less vulnerable	Water compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test required	✓	✓	✓
Zone 3a †	Exception Test required †	X	Exception Test required	✓	✓
Zone 3b *	Exception Test required *	X	X	X	✓*

Key:

✓ Development is appropriate

X Development should not be permitted.

Notes to table 3:

- This table does not show the application of the Sequential Test which should be applied first to guide development to Flood Zone 1, then Zone 2, and then Zone 3; nor does it reflect the need to avoid flood risk from sources other than rivers and the sea;
- The Sequential and Exception Tests do not need to be applied to minor developments and changes of use, except for a change of use to a caravan, camping or chalet site, or to a mobile home or park home site;
- Some developments may contain different elements of vulnerability and the highest vulnerability category should be used, unless the development is considered in its component parts.

† In Flood Zone 3a essential infrastructure should be designed and constructed to remain operational and safe in times of flood.

* In Flood Zone 3b (functional floodplain) essential infrastructure that has to be there and has passed the Exception Test, and water-compatible uses, should be designed and constructed to:

- remain operational and safe for users in times of flood;
- result in no net loss of floodplain storage;
- not impede water flows and not increase flood risk elsewhere.

4.0 Development and Flood Risk

4.1 Proposed Development Vulnerability Classification

The proposed re-development site proposes providing an additional hotel with a separate unit for student accommodation over land currently used as the conference centre. The existing land use is retained by the proposed development which is identified as “More Vulnerable” in Table 2 of NPPF. Table 3 in NPPF identifies that More Vulnerable land uses are appropriate within Flood Zones 1 and 2 and that where proposed within Flood Zones 3a and Exception Test would be required. More Vulnerable land uses are not permissible in Flood Zone 3b “Functional Flood Plane”.

4.2 Flooding from Rivers and Seas

A Groundsure Flood Insight Report (extracts in [Appendix D](#)) provides flood map data taken from the Environment Agency (EA) records and indicates the development site as being within Flood Zone 1 where there is less than 0.1% (1:1000 year) annual probability of Fluvial (Rivers) flooding or less than 0.5% (1:200 year and 1:200 year) annual probability of Tidal (Sea) flooding. The nearest Flood Zone 2/3 is located between 250m and 500m west of the site, associated with Ellen Brook.

4.3 Historic Flooding

The historic flooding incidents map covering the development area identified no historic flooding incidents occurring on site, the nearest Environment Agency recorded incident being located more than 500m west of the site on St Albans Road West.

4.4 Flood Defences

It is identified that the site does not benefit from the effects of any existing flood defence infrastructure and it is not proposed to provide any that will benefit the site in the future.

4.5 Flooding from Groundwater

A groundwater flood risk map is considers geology and historic groundwater depth information to estimate a probability of flooding as a result of groundwater emergence. The map data provided indicates that there is limited potential for flooding as a result of groundwater and recommends that no further action is required. The site also benefits from a High Confidence rating that groundwater flooding on site will not occur.

4.6 Flooding from Adopted Sewers

As identified in paragraph 2.4 above, a predevelopment enquiry was carried out by Thames Water for the scheme. A record of historic sewer flooding in the area was not provided as part of the enquiry. However their response identified that the public sewers had the capacity to accommodate the site's foul flows as long as they did not exceed the flows currently leaving the site.

Currently foul water drains from the development enter public foul water sewers within St Albans Road West. From an assessment of Thames Water sewer records provided, both foul sewers have been laid with slack gradients, which minimise their capacity.

The proposed development will increase foul flows by almost twice the current rate and increase the proposed surface water runoff. Thames Water confirmed in their planning consultation response that surface water must not enter the public foul water sewer network.

Thames Water also state that consideration should be made to groundwater. However the Borehole logs found within the Phase 2 Ground Investigation report identify groundwater to be at a level that should not cause risk to the development. Evidence of a thick Clay cap immediately beneath the surface would act as a cap, preventing groundwater to graduate through to the surface.

A copy of the Thames Water pre-development response and planning consultation response emails are found in [Appendix C](#)

4.7 Flooding from Private Drainage

The existing private combined water drains within the development have the potential for high flows during intensive return periods due to the mixture of surface water runoff with foul water runoff. Although there is no historic evidence of flooding to the private drainage, the consequences of flooding are more severe from a combined water system than a separate surface and foul water system.

It should be noted that records of private drainage flooding for the site have not been recorded and therefore not provided as part of this report; however this does not mean that flooding of the private drains has not occurred on site historically.

Although there is a potential for the site to suffer flooding of the existing combined water private drains, the proposed development will provide a separate foul and surface water drainage network and provide attenuation to the surface water in order to provide betterment to the surface water runoff flows currently exiting the site. This will provide betterment to the existing drainage around the current hotel complex. The attenuation provided will prevent flooding from private drainage for storm events up to and including the 1 in 100 year return period including climate change.

4.8 Flooding from Surface Water

Flooding from surface water has been identified as being high, where there is the potential for surface water to collate on site to a level up to 0.3m during the 1 in 75 year critical storm event. The map information provided indicates that the areas identified as high are concentrated along the northern side of the hotel building as well as at the base of the embankment with Comet Way in the south-east corner.

It is recommended that external levels around the existing hotel building and the new buildings will be re-graded to fall away from the building thresholds, thereby mitigating against surface water entering the building causing damage. The existing surface water drainage will be diverted into the new surface water system.

4.9 Overall Flood Risk

The development site has been identified as being at very low risk of flooding as a result of Fluvial (Rivers) or Tidal (seas) flows. It is identified that the site has less than 1 in 1000 year risk of flooding from Rivers and less than 1 in 200 year risk of flooding from seas. The site is therefore identified as being within Flood Zone 1. The site's "more vulnerable" land use is therefore suitable within this Flood Zone. The site has also been identified as being at low risk of flooding from all other sources of flooding.

Extracts from the Groundsure Flood Insight report is found in [Appendix D](#).

4.10 Consultation with Hertfordshire County Council

Hertfordshire County Council provided details of their Summary Guidance for Developers on "Management of Surface Water Drainage".

Findings of the Management of Surface Water Drainage:

"The proposed does not create an increased risk of flooding from surface water to the development site and the surrounding area"

"It should be carried out in accordance with NPPF and the Practice Guide, giving preference to infiltration over discharge to a watercourse, which in turn is preferable to discharge to surface water sewer."

The FRA should demonstrate:

Runoff rates – peak from the site will not increase for up to 1 in 100 chance in any year including climate change. Hertfordshire expect Greenfield runoff rates for Greenfield sites to be achieved and aim for Greenfield rates for brownfield sites.

Storage volume – should include up to the 1 in 100 year event including climate change allowance, as per NPPF, with no flooding across the site up to the 1 in 30 year return period and flooding to be retained within the confines of the site up to the 1 in 100 year event.

A copy of the Hertfordshire County Council Management of Surface Water guidance is found in [Appendix G](#).

4.11 Consultation with Environment Agency

Further to consultation with the Hertfordshire Lead Local Flood Authority and results of the site based falling head tests it was determined that an alternative outfall option from using soakaways would be required. Following the hierarchy as set out their consultation response our next option would be to discharge to a watercourse, the nearest being Ellen Brook approximately 455m south-west

The Environment Agency requested that the surface water discharge rate would be limited to Greenfield runoff equivalents and that the site's attenuation should be able to accommodate storm events up to and including the 1 in 100 year event plus climate change allowance.

The Environment Agency confirmed that the connection into Ellen Brook would require a Flood Defence Consent and that the outfall headwall should be in line with their typical construction details.

The Environment Agency did not have any major concerns for the scheme.

A copy of the Environment Agency correspondence is found in [Appendix I](#).

5.0 Drainage Strategy

5.1 Proposed Development

It is being proposed to demolish the existing conference centre to provide 308 student beds and a new hotel building with 56 serviced apartment beds, plus associated car parking.

It is being proposed to provide separate piped foul and surface water drainage networks.

The foul network will pick up the soil outlets from the internal arrangement of the new buildings and direct the flows to the existing demarcation chamber by the St Albans Road West access, prior to connections into public sewer manholes 1301 and 2301 via the existing connections.

This drainage strategy has considered the surface water discharge outfall options and has determined the following:

- Infiltration testing carried out as part of the Phase 2 Ground Investigation and geological studies incorporated therein, prove the use of soakaways are not a viable discharge solution for this development.
- The nearest public surface water sewer is located within Mosquito Way just north and on the opposite side of St Alban's Road West. However an assessment of the Commercial DW report from Thames Water identifies these sewers to have invert levels that would not permit a connection from the development site.
- An outfall can be made to Ellen Brook at its open channel location 455m south-west of the development, through a new length of surface water sewer to be adopted upon installation through a Section 104 with Thames Water.

From looking at the Environment Agency online Aquifer designation maps, it appears the site is located over Secondary A Aquifer superficial deposit layers as well as Principal Aquifer bedrock material. There is a possibility for low – moderate and in some cases even high levels of infiltration through the ground.

A phase 1 desktop study has been provided as part of this application; however the phase 1 study did not include for infiltration testing carried out on site. The phase 1 desktop study confirms the Environment Agency Aquifer designation maps that the superficial deposits beneath the site are a Principal Aquifer and the bedrock material is a Secondary A Aquifer.

A phase 2 desktop study with infiltration testing carried out on site has been carried out which shows the site as consisting of varying thicknesses of Clay above compacted Sands and Gravels. Falling head tests carried out within the boreholes identified low to no infiltration. It is unlikely that the geology would permit the use of infiltration and other options of surface water discharge should be used.

Based upon the assessment of the existing sewers in paragraph 2.4, both existing foul water sewers in St Albans Road West have a capacity of approximately 13l/s total flow each and Thames Water have

confirmed they have the capacity to accommodate the foul water flows from the development. They have stated surface water should not connect to either of these sewers.

An assessment of Greenfield runoff rates for the catchment covering the site, using the ICPSuDS method of estimating Greenfield runoff rates within Microdrainage has been carried out. Based upon 0.88 (ha) impermeable area from the proposed development, applying rainfall data taken from Flood Studies Report for the area and applying 0.47 Soil factor for a site with predominantly hard surfacing or Clay sub soils, a Qbar (Mean Annual Flood Flow) surface water discharge rate from the development is estimated at 4.1l/s. It is proposed that the minimum discharge rate for self-cleansing of 5l/s is thus applied to the surface water discharge from the site.

A drainage assessment of the proposed development is provided at [Appendix E](#).

5.2 Existing Surface Water Drainage

Currently the site consists of 0.93ha of mixed impermeable areas, from macadam car parking to roof areas. There are existing combined water drains crossing the site picking up the surface water flows from the existing hotel and conference buildings and directing the flows to the public combined water sewer in St Albans Road West.

Using the Rational Method of estimating urban runoff rates and assuming a 30mm 2 year rainfall intensity, 60mm 30 year rainfall intensity and 100mm 100year rainfall intensity; 0.93ha generates 77.56l/s for the 2 year return period, 155.12l/s for the 30 year return period and 258.54l/s for the 100 year return period. These values are estimated from Flood Studies Report rainfall data within Microdrainage.

From an assessment of the existing public sewers serving the site, the current public sewers do not have the capacity to accommodate these flows.

The existing private drainage pipes and manholes are to be abandoned where they pass through the existing conference centre buildings, but retained where they take flows from the existing hotel building.

5.3 Proposed Surface Water Drainage

The proposed development will demolish the existing convention centre buildings to the rear of the hotel and provide an extension to the existing hotel as well as student accommodation blocks. There will be a reduction on the number of parking spaces leading to an overall reduction in the sites impermeable area, which will reduce to 0.88(ha).

As determined in paragraph 4.6 above, the existing public foul water networks within St Alban's Road West have the capacity to accommodate the increase in foul flows but must not take any surface water flows from the development.

An assessment of the hierarchy of surface water outfall options identifies that where soakaways are not viable the next desirable method of surface water discharge is to a natural watercourse.

This strategy therefore proposes to discharge surface water runoff via a piped surface water sewer running south-west along the highway embankment of Comet Way for approximately 455m to a point of discharge into Ellen Brook, where there is an open channel. This will be provided under a Section 104 Agreement with Thames Water. Surface water runoff from the development will be limited to 5.0l/s for up to and including the 1:100 year return period including 30% climate change allowance.

A drainage strategy has been provided within [Appendix F](#) indicating the proposed drainage routes and discharge points for both surface and foul water drainage.

Microdrainage's Source Control module has been used to provide quick storage estimates of the proposed impermeable areas when applying the 5.0l/s limited discharge rate, and estimates the site would require an average of 608m³ of attenuation to accommodate the runoff from storm events up to and including the 1 in 100 year return period (including 30% climate change allowance).

Consultation with Hertfordshire County Council's Lead Local Flood Authority identified the need to provide a minimum of two forms of water quality treatment prior to discharging surface water from the development into Ellen Brook. This drainage strategy incorporates this need and has provided filter trenches for roof runoff, permeable surfaced car parks with granular filter material provided within the sub-base and further filtration through the use of SDS type of attenuation tanks which incorporates granular filter material surrounding the perforated pipe running through the tank.

A Microdrainage designed network has been created of the proposed surface water drainage strategy and impermeable areas have been added to each pipe run to suit. The proposed attenuation systems have been added to the network and a hydrobrake flow control chamber has been added to the last manhole prior to discharge from the site boundary.

In total it is proposed that 1200m² of permeable paving will be provided which with a minimum 250mm depth of granular filter material at 30% void ratio will provide approximately 90m³ of attenuation. Approximately 260m length of granular filter trenches will be provided with average dimensions of 600mm wide by 750mm depth and having a min. 30% void ratio, providing approximately 35m³ of attenuation. These volumes will be sufficient to accommodate the flows for storm events up to the 1 year return period.

Further attenuation for storm events up to the 1 in 100 year return period (incl. 30% climate change allowance) will be provided by the below ground cellular attenuation tanks. The drainage strategy in [Appendix F](#) indicates 3 locations for the attenuation tanks. Tank 1 will provide approximately 246m³ of attenuation, Tank 2 will provide 135m³ of attenuation and Tank 3 will provide 110m³ of attenuation. A total of 616m³ of below ground attenuation has been provided which is sufficient to attenuate up to and including the 1 in 100 year return period including 30% climate change without flooding.

Micro-drainage calculations have been provided within [Appendix E](#).

5.4 Proposed Foul Water Drainage

The existing conference and 3* hotel building provided a total peak flow rate of 11 l/s, which was estimated using the British Water flows and loads demand information.

Using the same method of estimation the proposed hotel and student accommodation, with staff of 110 persons will generate average flows of 3.5l/s and peak flows of 21.0l/s. An increase of 10l/s over the existing peak foul water flows, more than doubles the foul loads on the existing public combined water sewer.

The proposed drainage strategy will separate surface water runoff from foul water flows and re-utilise the existing connections into the existing combined water sewers within St Albans Road West. The foul flows will be apportioned so that the existing Hotel building and extension will enter foul flows into the eastern system and the new student accommodation will enter foul flows into the western system. This connection strategy will be subject to confirmation with Thames Water.

The proposed drainage strategy can be seen in [Appendix F](#).

6.0 Conclusions and Recommendations

6.1 Flood Risk

As determined within Section 4 the overall risk of flooding from all sources is low. The site is noted as being entirely within Flood Zone 1 with the Environment Agency mapping.

The classification of the development is More Vulnerable and is therefore appropriate for this location.

The site is brownfield in nature and, being within a Flood Zone 1 the site is not subject to a Sequential Test.

Thames Water has been consulted through a pre-planning enquiry on the proposed development.

6.2 Drainage Strategy

The surface water drainage strategy proposes discharge from the development via an offsite piped sewer, along Comet Way to an outfall into Ellen Brook. Surface water discharge rates will be limited to 5.0l/s thereby obviating against the need to provide long term storage

The scheme has considered but discounted the following other methods of surface water outfall:

1. Using infiltration systems to discharge surface water runoff to the ground. The phase 2 ground investigation provided unsatisfactory infiltration properties, making their use unviable;
2. Discharging surface water via a piped outfall into a public surface water network in Mosquito Way. However the invert levels of the manholes in this road would not permit a gravitational sewer from the lowest point on the site and is therefore not a viable outfall option.

Foul flows from the development will be apportioned equally between the public foul water sewer networks within St Albans Road West, so as to not breach these sewer's capacities.

Appendix

Appendix A – Site Location Plan



Drawing Number: ICBR0037 - D - SK01		Revision: -
Status: Plannning		
Project: Ramada Hotel, Comet Way, Hatfield		
Title: Site Location Plan		
Scale: NTS	Size: A4	Date: 23.09.15
Drawn: SH	Checked: TN	



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Appendix

Appendix B - Topographical Survey

Appendix

Appendix C – Thames Water Plans and Correspondence

CommercialDW

Multisite Drainage & Water Enquiry



Property
Searches

7829 BRISTOL

Search address supplied	St Albans Road, Hatfield, AL109RH
Your reference	JB03/43.408
Our reference	CDWS/CDWS Standard/2013_2630177
Received date	8 November 2013
Search date	22 November 2013

Important information

As of the 1 October 2013, the CON29DW has been updated with new question numbering and a helpful summary sheet showing questions and high level results. To find out more, please email searches@thameswater.co.uk.



Thames Water Utilities Ltd
Property Searches, PO Box 3189, Slough SL1 4WW
DX 151280 Slough 13



searches@thameswater.co.uk
www.thameswater-propertysearches.co.uk



0845-070 9148

COMMERCIALDW
DRAINAGE AND WATER ENQUIRY



CommercialDW Drainage and Water Enquiry Sewer Map- CDWS/CDWS Standard/2013_ 2630177



The width of the displayed area is 500m

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

Based on the Ordnance Survey Map with the Sanction of the controller of H.M. Stationery Office, License no. 100019345 Crown Copyright Reserved.

NB. Levels quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates no survey information is available.

Manhole Reference	Manhole Cover Level	Manhole Invert Level
4003	76.98	75.95
4004	76.68	71.95
2302	78.07	75.35
3301	77.95	74.92
3401	76.84	74.51
4403	76.4	74.04
4404	76.19	73.79
2101	77.21	75.37
3904	74.6	71.38
4006	75.55	71.68
4907	76.25	73.18
4005	76.58	75.48
4001	76.57	73.62
4002	76.6	74.63
1402	76.35	69.83
1405	76.62	70.31
1401	76.77	69.75
1415	76	74.31
1422	77.71	76.07
1421	77.09	75.47
1302	78.16	76.53
1419	76.36	74.66
1420	77.26	70.9
1404	77.63	71.54
1418	77.84	76.16
301	78.33	76.4
304	78.09	76.46
2301	78.36	75.74
2401	76.58	72.4
0101	74.44	72.76
0004	74.35	72.54
0003	74.21	72.45
0001	73.75	71.95
0005	75.11	73.37
0002	74	72.16
101A	n/a	n/a
101B	n/a	n/a
101C	n/a	n/a
111A	n/a	n/a
1101	76.55	74.51
1001	75.08	73.14
111B	n/a	n/a
1002	76.43	74.51
0201	76.36	73.71
1201	77.84	75.94

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.



Sewer Key - Commercial Drainage and Water Enquiry

Public Sewer Types (Operated & Maintained by Thames Water)

	Foul: A sewer designed to convey waste water from domestic and industrial sources to a treatment works.		
	Surface Water: A sewer designed to convey surface water (e.g. rain water from roofs, yards and car parks) to rivers or watercourses.		
	Combined: A sewer designed to convey both waste water and surface water from domestic and industrial sources to a treatment works.		
	Trunk Surface Water		Trunk Foul
	Storm Relief		Trunk Combined
	Vent Pipe		Bio-solids (Sludge)
	Proposed Thames Surface Water Sewer		Proposed Thames Water Foul Sewer
	Gallery		Foul Rising Main
	Surface Water Rising Main		Combined Rising Main
	Sludge Rising Main		Proposed Thames Water Rising Main
	Vacuum		

Notes:

- 1) All levels associated with the plans are to Ordnance Datum Newlyn.
- 2) All measurements on the plans are metric.
- 3) Arrows (on gravity fed sewers) or flecks (on rising mains) indicate direction of flow.
- 4) Most private pipes are not shown on our plans, as in the past, this information has not been recorded.
- 5) 'na' or '0' on a manhole level indicates that data is unavailable.

Sewer Fittings

A feature in a sewer that does not affect the flow in the pipe. Example: a vent is a fitting as the function of a vent is to release excess gas.

	Air Valve
	Dam Chase
	Fitting
	Meter
	Vent Column

Operational Controls

A feature in a sewer that changes or diverts the flow in the sewer. Example: A hydrobrake limits the flow passing downstream.

	Control Valve
	Drop Pipe
	Ancillary
	Weir

End Items

End symbols appear at the start or end of a sewer pipe. Examples: an Undefined End at the start of a sewer indicates that Thames Water has no knowledge of the position of the sewer upstream of that symbol, Outfall on a surface water sewer indicates that the pipe discharges into a stream or river.

	Outfall
	Undefined End
	Inlet

- 6) The text appearing alongside a sewer line indicates the internal diameter of the pipe in millimetres. Text next to a manhole indicates the manhole reference number and should not be taken as a measurement. If you are unsure about any text or symbology present on the plan, please contact a member of Property Searches on 0118 925 1504.

Other Symbols

Symbols used on maps which do not fall under other general categories

	Public/Private Pumping Station
	Change of characteristic indicator (C.O.C.I.)
	Invert Level
	Summit

Areas

Lines denoting areas of underground surveys, etc.

	Agreement
	Operational Site
	Chamber
	Tunnel
	Conduit Bridge

Other Sewer Types (Not Operated or Maintained by Thames Water)

	Foul Sewer		Surface Water Sewer
	Combined Sewer		Gully
	Culverted Watercourse		Proposed
			Abandoned Sewer



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The position of Company apparatus shown on this plan is provided for guidance only and the Company accepts no responsibility in the event of inaccuracy. For further information about the contents of this plan, please contact Affinity Water on 0845 7823333 or at the address below.

Affinity Water, Tamblin Way, Hatfield, Hertfordshire, AL10 9EZ. www.affinitywater.co.uk/central
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This map is centred upon Ordnance Survey grid reference

521254.208245



1:1245

22/11/2013

Alex Halford

From: DEVELOPER.SERVICES@THAMESWATER.CO.UK
Sent: 10 August 2015 16:03
To: Alex Halford
Subject: IRef:1013117161

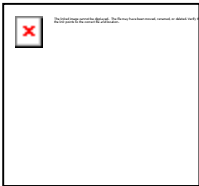
Alex Ref AL10 9RH Ramada Hotel

Provided the overall combined discharge from the site is not increased we would not have a concern for this proposed discharge, however we are not the statutory consultee for the surface water discharge as the Drainage Authority(Council) is and may require a further betterment. If the swimming pool is not to be replaced then a considerable reduction in discharge would be agreed and are you aware of an effluent discharge license that was in place?

Regards

Geoff Nokes
Development Engineer - Waste

✉ Thames Water Utilities Ltd, Clearwater Court, Vastern Road, Reading, RG1 8DB
☎ helpdesk 0800 009 3921 direct 02035779228
📧 geoff.nokes@thameswater.co.uk



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We provide the essential service that's at the heart of daily life.

Alex Halford

From: BCTAdmin@thameswater.co.uk
Sent: 03 November 2015 14:18
To: Planning
Subject: 3rd Party Planning Application - 6/2015/1997/MAJ

Head Of Development Control
Welwyn Hatfield District Council
Council Offices, Campus East
Welwyn Garden City
Hertfordshire
AL8 6AE

Our DTS Ref: 48617
Your Ref: 6/2015/1997/MAJ

3 November 2015

Dear Sir/Madam

Re: COMET HOTEL, ST. ALBANS ROAD WEST, HATFIELD, HERTFORDSHIRE, AL10 9RH

Waste Comments

With the information provided Thames Water, has been unable to determine the waste water infrastructure needs of this application. Should the Local Planning Authority look to approve the application ahead of further information being provided, we request that the following 'Grampian Style' condition be applied - "Development shall not commence until a drainage strategy detailing any on and/or off site drainage works, has been submitted to and approved by, the local planning authority in consultation with the sewerage undertaker. No discharge of foul or surface water from the site shall be accepted into the public system until the drainage works referred to in the strategy have been completed". Reason - The development may lead to sewage flooding; to ensure that sufficient capacity is made available to cope with the new development; and in order to avoid adverse environmental impact upon the community. Should the Local Planning Authority consider the above recommendation is inappropriate or are unable to include it in the decision notice, it is important that the Local Planning Authority liaises with Thames Water Development Control Department (telephone 0203 577 9998) prior to the Planning Application approval.

Thames Water requests that the Applicant should incorporate within their proposal, protection to the property by installing for example, a non-return valve or other suitable device to avoid the risk of backflow at a later date, on the assumption that the sewerage network may surcharge to ground level during storm conditions.

Surface Water Drainage - With regard to surface water drainage it is the responsibility of a developer to make proper provision for drainage to ground, water courses or a suitable sewer. In respect of surface water it is recommended that the applicant should ensure that storm flows are attenuated or regulated into the receiving public network through on or off site storage. When it is proposed to connect to a combined public sewer, the site drainage should be separate and combined at the final manhole nearest the boundary. Connections are not permitted for the removal of groundwater. Where the developer proposes to discharge to a public sewer, prior approval from Thames Water Developer Services will be required. They can be contacted on 0800 009 3921. Reason - to ensure that the surface water discharge from the site shall not be detrimental to the existing sewerage system.

'We would expect the developer to demonstrate what measures he will undertake to minimise groundwater discharges into the public sewer. Groundwater discharges typically result from construction site dewatering, deep excavations, basement infiltration, borehole installation, testing and site remediation. Any discharge made without a permit is deemed illegal and may result in prosecution under the provisions of the Water Industry Act 1991. Should the Local Planning Authority be minded to approve the planning application, Thames Water would like the following informative attached to the planning permission: "A Groundwater Risk Management Permit from Thames Water will be required for discharging groundwater into a public sewer. Any discharge made without a permit is

deemed illegal and may result in prosecution under the provisions of the Water Industry Act 1991. We would expect the developer to demonstrate what measures he will undertake to minimise groundwater discharges into the public sewer. Permit enquiries should be directed to Thames Water's Risk Management Team by telephoning 02035779483 or by emailing wwqriskmanagement@thameswater.co.uk. Application forms should be completed online via www.thameswater.co.uk/wastewaterquality."

Water Comments

With regard to water supply, this comes within the area covered by the Affinity Water Company. For your information the address to write to is - Affinity Water Company The Hub, Tamblin Way, Hatfield, Herts, AL10 9EZ - Tel - 0845 782 3333.

Supplementary Comments

Please supply evidence of current surface water discharge rates for existing connection points to public sewer. If this evidence won't be provided or proposed foul water flow exceeds current combined discharge rate Thames Water will request that an impact study be undertaken. Sewer in St Albans Road is a foul water sewer and not combined as mentioned in Flood Risk Assessment dated 25th September 2015 (ICBR0037-RP-001).

Thames Water does not support connection of surface water into a public foul sewer system. This reduces capacity for future development and has the potential to cause flooding to existing customers.

Development should utilise sustainable urban drainage systems (SUDS) unless there are practical reasons for not doing so, and should aim to achieve greenfield run-off rates and ensure that surface water run-off is managed as close to its source as possible in line with the following drainage hierarchy:

- 1 store rainwater for later use
- 2 use infiltration techniques, such as porous surfaces in non-clay areas
- 3 attenuate rainwater in ponds or open water features for gradual release
- 4 attenuate rainwater by storing in tanks or sealed water features for gradual release
- 5 discharge rainwater direct to a watercourse
- 6 discharge rainwater to a surface water sewer/drain (which may not necessarily be a public sewer)
- 7 discharge rainwater to the foul water sewer.

If single solution is impossible to achieve, combination of all the above should be used.

Connection of surface water to a Foul Sewer will only be considered when all other methods of disposing of the surface water have been proven impracticable.

As FRA offers connection to sewer in St Albans Road as a third option of surface water disposal, we believe that other methods are practical and we expecting that drainage strategy will be reviewed and updated accordingly.

Yours faithfully

Development Planning Department

Development Planning,
Thames Water,
Maple Lodge STW,
Denham Way,
Rickmansworth,
WD3 9SQ
Tel:020 3577 9998
Email: devcon.team@thameswater.co.uk

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Appendix

Appendix D – Groundsure Report