



Dorset Innovation Park LDO Development Drainage Strategy

For Purbeck District Council

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Dorset Innovation Park - Drainage Strategy

1. INTRODUCTION

This Drainage Strategy has been prepared by Hydrock on behalf of Purbeck District Council in support of a planning application to be submitted to Purbeck District Council for a proposed development at the Dorset Innovation Park site.

The intention of this report is to prove that the proposed development is able to operate to a satisfactory and compliant standard with respect to foul and surface water drainage.

The report is also intended to provide practical drainage guidance to the designers of future development plots; to help them understand how to consider the relevant drainage constraints within their design and provide the necessary on-plot drainage infrastructure on that individual plot, to meet the requirements of this strategy.

This report relies as much on its associated drawings as its text; with key drainage facts such as development plot drainage connection points, surface water attenuation volume requirements and drainage-related development constraints being clearly identified on drawings, so that criteria can be fully considered within the detailed design of that plot at a later date.

Despite plot specific drainage solutions being shown on the proposed drainage strategy drawings, there is flexibility within the strategy and within the conclusions for each plot to locally move drainage connection points and alter the form and position of surface water attenuation structures/bodies, to enable the designer to provide the optimal development layout whilst complying with the drainage requirements as set out in this strategy report.

Within this report, for ease of reading, the use of the term "the site" refers to the proposed commercial and industrial development at Dorset Innovation Park, which is to be situated within the core infrastructure framework of the current, largely vacant site.

This report is separate to the Dorset Innovation Park LDO Flood Risk Assessment report by Hydrock DIP-HYD-ZZ-XX-RP-D-5001 S2 P03. Matters relating to flood risk, apart from surface water drainage flood risk are covered in that document.

2. SITE INFORMATION

2.1 Location

Dorset Innovation Park is situated on part of the former Winfrith AEE research establishment (1960-1990). The site has an overall area of approximately 40ha and is situated west of Wool, Dorset. The site is roughly bounded by the Christchurch to Dorchester railway line to the north, other industrial buildings and minor access roads before Gatemore Road to the west and the River Win to the southeast. The site location is shown in Figure 1, with full address and Ordnance Survey Grid Reference in Table 1.

Site Address	Dorset Innovation Park
	Winfrith Newburgh, Wool, Dorchester, DT2 8ZB
Grid Reference	SY819869
	381973, 86907

Table 1: Site Referencing Information

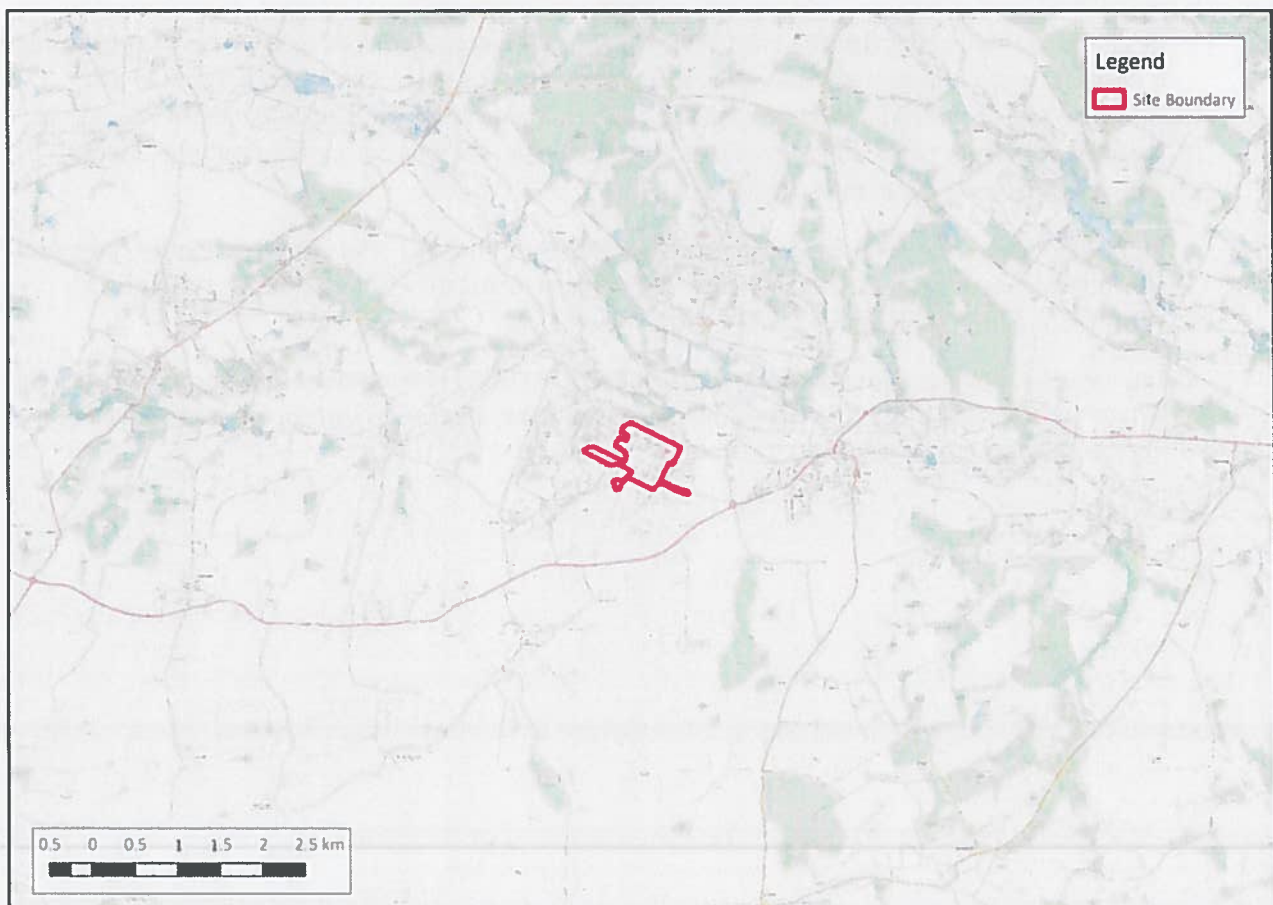


Figure 1: Site Location

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2.2 Topography

Ground levels on site fall from approximately 26m AOD in the west to approximately 20m AOD in the east. A detailed topographical survey is included in Appendix A.

2.3 Existing Site Overview

The site is currently partially developed, largely vacant, with industrial buildings interspaced with areas of grass, trees and minor internal access roads. The existing site layout is shown in on the topographical survey in Appendix A. The former AEE Winfrith development is shown on the plan with in Appendix AB.

2.4 Proposed Development

The proposed development is for the demolition of some existing buildings, and construction of a number of new commercial and industrial developments plus associated open space in their place and within currently vacant areas of the site. The proposed Dorset Innovation Park masterplan layout is included in Appendix C. The proposed development floor area is circa 75,000m² which is comprised of office, light industrial, industrial and

One of the objectives of the Dorset Innovation Park master-planning exercise is to produce a development framework to inform the future successful commercial and industrial developments on the site; which is to be split into a number of identified development plots that suit a variety of potential users and tenants.

In terms of development drainage, the master-planning project will set out the drainage provision, design criteria and requirements of each development plot, so that those requirements can be fully considered within the design of any plot on the site and the wider-site infrastructure.

3. PROJECT HISTORY AND PAST WORK

In the previous project stage, an Engineering and Ecological Constraints document (ref. 7029010-May 2017) was prepared by WSP on behalf of Purbeck District Council. Part of that document was a summary of the existing drainage infrastructure, an outline drainage strategy and recommendations for further drainage strategy work.

This drainage strategy report follows on from the May 2017 Engineering and Ecological Constraints document by applying a defined drainage strategy and survey findings to the July 2018 proposed development masterplan by Stride Treglown.

4. EXISTING DRAINAGE INFRASTRUCTURE

4.1 Foul Water Drainage

4.1.1 Overview

The site is served by an extensive network of existing foul sewers, which drain through a series of holding tanks and pumping stations before finally discharging north to the Wessex Water Wool treatment works, which is located adjacent to the river Frome.

4.1.2 Provision and Capability

Due to the former use of the site, the existing foul drainage system is extensive and covers every part of the site. It provides a good opportunity for widespread re-use to serve the proposed development. Part of the network is privately owned and part is adopted by Wessex Water.

The widespread extent of the main gravity sewers are such that across the site there are ample opportunities for future development plots to connect to the drainage system without unreasonable long "off-plot" connection works.

It is understood that the existing site (and its foul drainage system) was designed to accommodate a workforce of 4,000 people. The maximum occupancy reached during its operation was 2,000 people. The total occupation of the re-developed site is expected to be in the order of 2,000 to 2,500 people, which is less than the design capacity of the former development. Based on this comparison, the treatment works is expected to be capable of accepting this load. Any proposed high flow discharges from industrial processes on any future plot will need to be considered against the overall discharge capacity allowance, to avoid a single plot securing more flow than its share of the overall capacity. Flow control and storage employed on this type of discharge will resolve those concerns.

Future foul drainage connections from the proposed development plots, either direct to the public sewers or indirect via private sewers will have to be approved by Wessex Water, first as a part of a local development order or a planning application and then under a section 106 agreement with Wessex Water.

4.1.3 Layout

The layout of the existing drainage foul system is shown on the existing drainage drawing within in Appendix C.

This drawing shows the extent of the existing foul drainage, the location of pumping and storage infrastructure, key pipe sizes, key depths and the ownership status (private/Wessex Water public) and the easements that apply to these sewers.

For ease of reference, the main lengths of existing foul drainage are referred to by the internal road name that they follow, or by references noted on the drainage drawing, e.g. FS1, FS2, PS1. The main pipe sizes, capacities and identified major defects are also presented on that drawing.

The drainage layout drawing has been collated based on several existing drainage information sources. The drainage that is proposed to be re-used for the proposed development has been charted and presented on the existing drainage drawing. However, considering the extensive former industrial use of the site, there may be additional uncharted redundant drainage systems that are still in place, particularly minor drain runs that served former buildings or car parks that have since been demolished. If such drain lines are encountered during the detailed design of each individual plot then the designer should confirm that line is redundant by means of a drainage survey and allow for its removal.

4.1.4 Ownership

Wessex Water sewer asset records are included in Appendix CE. to supplement the existing drainage drawing. Wessex Water are responsible for the ownership, operation and maintenance of these pipes, tanks and pumping stations. Any works that directly or indirectly affect these sewers is subject to agreement with Wessex Water. Easement restrictions apply, which will dictate how close permanent building structures are placed to the existing public sewer.

Other drainage infrastructure that is not shown on the Wessex Water sewer records as public sewer infrastructure is privately owned by Dorset Innovation Park.

4.1.5 Condition

A CCTV condition survey has been carried to determine the general condition of the existing key elements of the foul water drainage infrastructure.

The purpose of this survey was to determine whether the existing drainage is suitable for re-use in the permanent development case in principle and to identify the nature of short to long term remedial works and maintenance requirements.

This survey was not completed to identify and inspect every single existing pipe, but to provide an overall indication of the suitability of the site-wide surface water drainage system for re-use.

At a later stage an extended development plot-specific survey could be carried out to identify maintenance and minor defect repair works that could be done as part of an enabling works contract, to ensure that future plots have a good quality connection to the main infrastructure drainage system.

Generally, the main foul water drainage network is structurally sound 150mm diameter (clay pipes), is mostly clean and free running and has good quality access points throughout the site.

In several isolated locations an additional jetting and cleaning exercise is required to clear fine roots, and some standing debris in pipes. These types of issue are not considered a barrier to the re-use of the drainage system for the proposed development and are considered closer to maintenance items.

The structural integrity of the pipes surveyed was good throughout.

The drainage survey information is included in Appendix G

4.2 Surface Water Drainage

4.2.1 Overview

The site is served by an extensive network of existing surface water drains, which serve 4 catchments across the site, which discharge to the local watercourse network at the River Win and River Frome via 4 discharge points. There is no means of flow rate reduction (attenuation) in place.

4.2.2 Provision and Capability

Due to the former use of the site, the existing surface water drainage system is extensive, has a high combined capacity and covers every part of the site. It provides a good opportunity for widespread re-use of the existing system to serve the proposed development.

The whole surface water drainage network is privately owned.

The widespread extent of the main gravity sewers is such that across the site there are ample opportunities for future development plots to directly connect to the surface water drainage system without unreasonable long "off-plot" connection works.

The discharge points to the Rivers Win and Frome from the drainage catchments will remain unchanged and are constructed to a good standard and are suitable for long-term re-use for the proposed development.

- **Surface Water Drainage Catchment 1:**
 - » Former Area Drained (Ha) = 12.15 of which 1.95 is impermeable
 - » Former Discharge rate (QBAR) = 8.3l/s
 - Discharge Location and form = Pipe discharge to the River Win
- **Surface Water Drainage Catchment 2:**
 - » Former Area Drained (Ha) = 14.04 of which 2.08 is impermeable
 - » Former Discharge rate (QBAR) = 19.3l/s
 - Discharge Location and form = Pipe discharge to the River Win
- **Surface Water Drainage Catchment 3:**
 - » Former Area Drained (Ha) = 9.44 of which 5.58 is impermeable
 - » Former Discharge rate (QBAR) = 17.6l/s
 - Discharge Location and form = Off-site pipe discharge to the River Win
- **Surface Water Drainage Catchment 4:**
 - » Former Area Drained (Ha) = 4.35 of which 1.00 is impermeable
 - » Former Discharge rate (QBAR) = 6.6l/s
 - Discharge Location and form = Off-site culvert connection to the River Frome

Refer to the discharge point pre and post development flow rate comparison table within Appendix H.

It is understood that when facility was fully developed and operational (1960-1990) the original surface water drainage system served up to 18Ha of hardstanding or roof space across a developed site area of 33Ha, which is equivalent to a surface water runoff rate of 88l/s during average annual storm event (QBAR) and 196l/s during the peak 1 in 100 year storm plus 40% allowance for climate change storm event (Q100)

An outline capacity assessment for the main parts of the existing surface water drainage network has been carried out, to indicate the approximate capability of each main surface water drainage line. The purpose of this check is not to confirm the exact capacity of every pipe, but to understand whether the existing drainage system was capable of coping with the unrestricted flows of the magnitude that would have been generated by the formerly developed site.

By proving that the system has a relatively high capacity, we can have confidence that the proposed development will not have problem with using it to convey the restricted flows that will be generated by the proposed development.

*In effect, the **post-development runoff flows** are to be restricted, so pipe flows will not be as high as the **former development unrestricted flows** when it was in operation and pipe flows will be less than or equal to the runoff flows generated by the **current site conditions**.*

4.2.3 Layout

The layout of the existing drainage foul system is shown on the existing drainage drawing within in Appendix C. This drawing presents a practical view of the following:

- Existing surface water sewers
- Drainage catchments
- Discharge points
- Key pipe sizes
- Key points on condition
- Notional easements (development exclusion zones) to ensure adequate future maintenance space

For ease of reference, the main lengths of existing surface water drainage are referred to by the internal road name that they follow, or by references noted on the drainage drawing, e.g. SW1, SW2 etc.

The drainage layout drawing has been collated based on several existing drainage information sources. The drainage that is proposed to be re-used for the proposed development has been charted and presented on the existing drainage drawing. However, considering the extensive former industrial use of the site, there may be additional uncharted redundant drainage systems that are still in place, particularly minor drain runs that served former buildings or car parks that have since been demolished. If such drain lines are encountered during the detailed design of each individual plot then the designer should confirm that line is redundant by means of a drainage survey and allow for its removal.

4.2.4 Condition

A CCTV condition survey has been carried out to determine the general condition of the existing key elements of the surface water drainage infrastructure.

The purpose of this survey was to determine whether the existing drainage is suitable for re-use in the permanent development case in principle and to identify the nature of short to long term remedial works and maintenance requirements.

This survey was not completed to identify and inspect every single existing pipe, but to provide an overall indication of the suitability of the site-wide surface water drainage system for re-use.

In most parts of the site there are two surface water drainage runs, side-by-side. One is a larger diameter (600mm+) and the other a smaller (300mm to 450mm)

At a later stage an extended development plot-specific survey could be carried out to identify maintenance and minor defect repair works that could be done as part of an enabling works contract, to ensure that future plots have a good quality connection to the main infrastructure drainage system.

Generally, the main large diameter surface water drainage network is structurally sound (concrete and clay pipes), is mostly clean and free running and has good quality access points throughout the site.

In several isolated locations an additional jetting and cleaning exercise is required to clear fine roots, some standing debris and encrustation around joints. These types of issue are not considered a barrier to the re-use of the drainage system for the proposed development and are considered closer to maintenance items.

The structural integrity of the pipes surveyed was good throughout.

The "intruding connections" on larger pipes are not considered a defect that has to result in the intruding pipe to be cut back. This is because the future flow into the pipes will be less than existing (due to attenuation) so the capacity limitation is minimal.

Instances of localised holes in sewers, possible due to old connections being removed will need to be rectified, to avoid further debris from entering the sewer.

Refer to the drainage survey references (e.g. SWMH15) shown on the plans included in Appendix G

1. SWMH 12 to 15 - Replace section of pipe 600mm between 122 and 124m from SWMH12
2. SWMH 23 to upstream - line the 300mm clay pipe between 11.0m and 14.00m
3. SWMH 19-2 to 19.1 - full jet clean and re-survey, condition expect to be satisfactory
4. SWMH 15 to 15.1 (to the west of 15) - line the 375mm pipe between 15.0 (after the connection) to 18.00
5. SWMH2 to downstream manhole (south) - replace section of 225 pipe between 17.00 and 19.00
6. SWMH5 to downstream - fully jet clean this line

It is recommended that these works are done at an early stage of the proposed development, ideally as an enabling works contract.

5. FOUL WATER DRAINAGE STRATEGY

5.1 Development Requirements

The overall foul drainage strategy for the proposed development is to utilise the extensive existing foul drainage network across the site. The system is largely adopted by Wessex Water and is in working order and is considered suitable for long term re-use by new developments.

All the future development across the site plots require a suitable foul connection point to be identified, within or near to their plot boundaries. Those connection points should be capable of accepting the foul flow to be generated by the proposed development on that plot, which will then reach the wider public sewer network.

The proposed foul flow from each development plot across the site has been calculated and is presented in the table on the proposed drainage drawing within Appendix F. This is based on the anticipated foul flow generated by the proposed plot development based on occupancy and type (e.g. office).

5.2 Plot Discharge Points

The proposed foul drainage connection points for each development plot across the site has been indicated on the proposed drainage drawing within Appendix F. The anticipated drainage connection spur, with its anticipated pipe size, invert level and allowable discharge flow are summarised in the table on the same drawing. The exact position of the proposed connection point is not firmly fixed and there is a level of flexibility in its final position before it connects into the receiving sewer, providing that receiving sewer remains the same identified line. The intention is not to be over-prescriptive to a point where it is detrimental to the design of that plot.

5.3 Ownership and Maintenance

Wessex Water will remain responsible for the operation and maintenance of the public gravity sewers and pumping installations across Dorset Innovation Park.

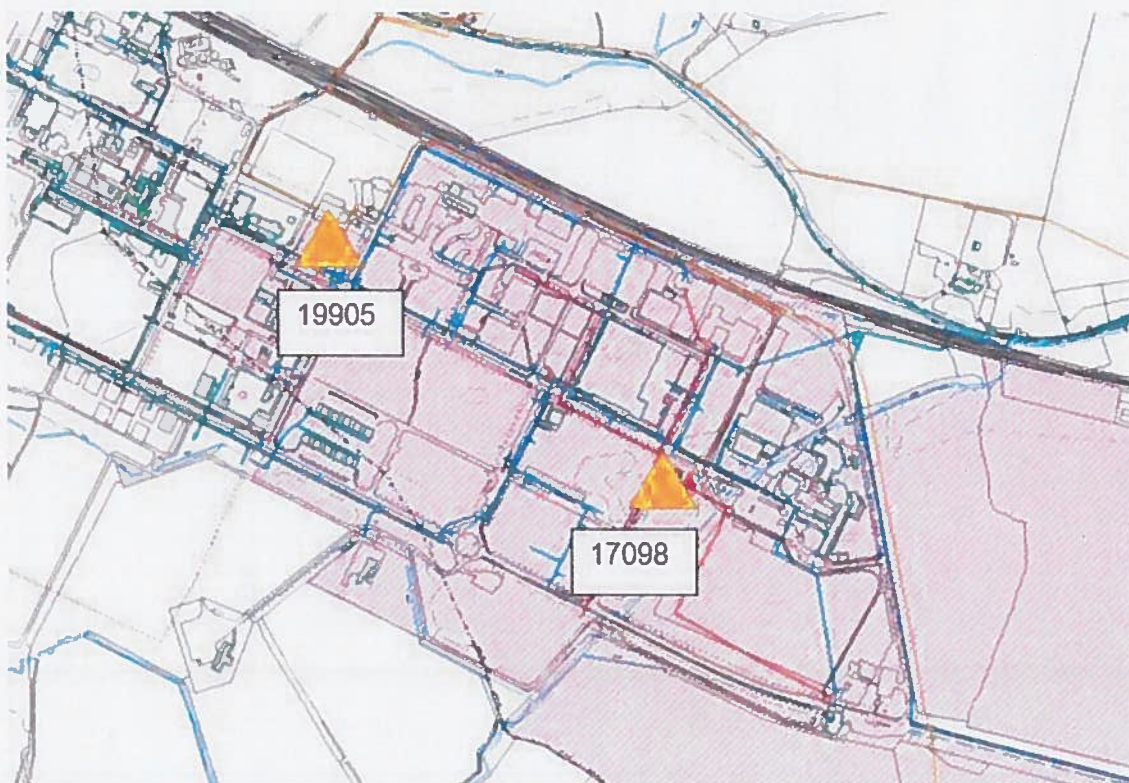
Shared privately owned infrastructure, either within the estate roads, alongside the roads (but within plot boundaries) and in other parts of the wider site shall be maintained by Dorset Innovation Park as part of the estate management contract. On-plot drainage serving new buildings is the responsibility of the building owner.

5.4 Approvals and Consents

The approval of the principles of this foul drainage strategy will come from Wessex Water via the planning process as they are the relevant statutory Authority.

A consultation response was received from Wessex Water on 27th July 2018 (Teddy Amuah) a summary of this is given below:

- The drainage infrastructure for the Park was designed to accommodate 4,000 employees and the regeneration of the site will result in a built out total of 2,000 to 2,500.
- Wessex Water will liaise with the applicant as the development progresses to review capacity which will be driven by large trade effluent consents, process users or development elsewhere in the catchment.
- Wessex Water have confirmed that they have no issues with the masterplan in principle, in relation to current available sewerage and water supply capacity.
- Wessex Water assume that the masterplan has been developed in relation to odour modelling recommended, to ensure that the northern part of the site is not affected by odour from the sewage treatment works.
- As per the sewer map. There are multiple WW assets within the site boundary and indicated below:
19905 - WINFRITH NEWBURGH SPS & 17098 - WINFRITH NEWBURGH SPS 2



- Existing and previous connections can be reused via the possible the on-site connections, subject to detailed site layout, condition and capacity.
- All redundant connections to the public sewer system should be sealed off.
- The onus falls with the developers to review the on-site/ previous drainage (using site surveys etc. and as per easements/detailed design layout and available capacity to agree an adequate point of connection for the site (plots).
- There are also multiple rising mains and public foul sewers within the site boundary and hence statutory easements apply.
- Private assets: there are also private pumping stations on site which have not been highlighted as not Wessex Water responsibility.

The approval for any public sewer remedial works that are potentially done as part of an enabling works contract for Dorset Innovation Park lies with Wessex Water as it is on their public sewer infrastructure.

In terms of foul drainage, the future design, planning and construction of individual development plots is subject to approval by Wessex Water. This will ensure that public sewer easements are respected, flow limits are complied with and consents are secured for direct or indirect sewer connections. The responsibility for this lies with the developer of the individual plots.

5.5 Plot Designer Requirements

As mentioned in the introduction of this report, one of the objectives of this report is to provide useful practical information to the future designers of the individual development plots to enable them to be aware of the drainage constraints, the restrictions on foul flow rates and the suggested drainage connection points. The designer is expected to comply with these requirements, but there is flexibility to allow variations, subject to investigation, calculated proof and agreement with the relevant authority (e.g. planning, Wessex Water, Purbeck District Council).

6. SURFACE WATER DRAINAGE STRATEGY

6.1 Development Requirements

The overall surface water drainage strategy for the proposed development is to utilise the extensive existing surface water drainage network across the site. The system is privately owned and is in working order and is considered suitable for long term re-use by new developments.

All the future development across the site plots require a suitable surface water connection point to be identified, within or near to their plot boundaries. Those connection points should be capable of accepting a surface water runoff flow generated by the proposed development on that plot, which will then reach the wider surface water drainage network within the site, through to the relevant watercourse discharge point.

6.2 Drainage and Flood Risk Policy

With the extensive flood plan associated with the River Frome along with the more limited flooding from the River Win, it is necessary to ensure that the Surface water management of the Innovation Park is effectively managed.

National Planning Policy Framework sets out the requirement for flood risk management and flood protection and has been considered within the formation of this strategy, with the main objective being to control and reduce the risk of flooding on the development and the wider area.

6.2.1 Baseline conditions

Despite the former use of the site (AEE Winfrith), which included extensive industrial development, and hardstanding space, it is not considered appropriate to use that case as the baseline scenario on which this drainage strategy is to improve on. At the time that facility was operating the percentage of the site that was drained impermeable surface was between 55%.

Since the closure and demolition the Dorset Innovation Park site is relatively sparsely developed with extensive undeveloped, permeable spaces. At present the percentage impermeable surface space is between 33%. Therefore, the existing runoff and discharge to the local watercourse network is lower than previous.

This surface water drainage strategy is based on the current state of the site and not the former development state. The drainage requirements within the strategy are based on improving the current situation.

The fact that the former use of the site contained so much more drained hardstanding is beneficial, because the drainage infrastructure installed for that development served a far higher flow than the proposed Dorset Innovation Park development will generate, once flow reduction and attenuation measures are provided throughout the site.

6.3 Compliance

In order to comply with drainage and flood risk policy, the core objective of the surface water drainage strategy is to reduce the potential on and off site flood risk via drains, sewers and watercourses by limiting the discharge rate of all the proposed development plots to a flow rate less than or equal to the existing runoff rate, even if that site is undeveloped grassland.

*Total post-development surface water discharge rate during the
1 in 100 year storm event, plus a 40% allowance for climate change (Q100+40%)*

Will be less than or equal to the:

*Average annual runoff rate from the existing site
(QBAR Greenfield or part-Greenfield runoff rate)*

This level of protection will limit the risk of flooding on the developed site and off the site, to a level equal to the current state, on an annual basis, but during all storm events up to the worst case 1 in 100 year event plus and extra 40% allowance for climate change.

A summary of pre and post development flows at the outfall, for each catchment is provided in Appendix H, where it concludes that there is no increase in discharge rate in the post-development state.

6.4 Other Options Considered

It is standard practice to follow the surface water drainage disposal hierarchy, the preferred option being to discharge collected runoff to the ground via infiltration (basins, swales and soakaways). In this case it has been considered but unfortunately discounted.

Additionally, with the extensive level of existing sewerage infrastructure already in place at the site, which is able to be re-used for the proposed development it is considered reasonable, economically preferable and environmentally sustainable to use existing infrastructure when it is already in place.

6.4.1 Infiltration generally

The ground investigation information has identified that whilst there are sands and gravels that will provide appropriate infiltration rates, there is also a relatively high ground water level across the site. In some of the trial pits this is 1.5 to 2.0m below ground level. The standard requirement for acceptable infiltration drainage is that there is at least a 1.0m separation between the underside of the infiltration infrastructure and the highest level of ground water. Ground water extraction activity by Magnox on the adjacent site may cease in the near future that may result in changes to the groundwater profiles and a rise in level. On this basis it has been concluded that generally, infiltration drainage will not be appropriate for the site compared to the preferred flow restriction strategy. It is potentially possible that in those parts of the site that are at a higher elevation that there may be increased separation to the groundwater levels. That option remains open to the designers of the individual development plots if their site conditions are appropriate and the land-take within their plot is not excessive.

6.4.2 Swales

A further surface water drainage option that was explored was the use of a network of open swales, vegetated/grassed open channels for surface water conveyance and some infiltration.

These swales would run alongside the existing road network and would form one of the boundaries of most of the individual development plots. They would receive flows from the developments before discharging to the drainage network.

Whilst this was considered in earlier version of the masterplan, once the investigation into the existing drainage and services infrastructure routes was completed it was evident that all the main drainage lines, of which there are several along the roads and the main services corridors do not lie under the roads, but in the verges, through the proposed development plots.

The existing drainage and the services will remain in place, which will eliminate a strip of land alongside the road from the developable space per plot. If a swale (approx. 6m wide overall to allow for reasonable bank slopes) was to be included in addition to this reserved services strip the land-take from the plot was too excessive to accept. Also, the direction of the swales and their link pipes (for road crossings etc. would clash with the existing north/south drain and service routes so they could not be provided at those locations.

The fact that the site is so well sewered means that there is already an effective means of surface water drainage in place so another system is not necessary.

6.5 Plot Discharge Points

The proposed surface water drainage connection points for each development plot across the site has been indicated on the proposed drainage drawing within Appendix F. The anticipated drainage connection spur, with its anticipated pipe size, invert level and allowable discharge flow are summarised in the table on the same drawing. The exact position of the proposed connection point is not firmly fixed and there is a level of flexibility in its final position before it connects into the receiving sewer, providing that receiving sewer remains the same identified line.

The intention is not to be over-prescriptive to a point where it is detrimental to the design of that plot.

This also will allow for flexibility within the site, as developers and occupiers come forward and would also allow for the plots to change in configuration depending upon the market conditions and commercial interest.

6.6 On-Plot Attenuation

On-plot surface water storage, attenuation / flow control is required on each development plot to limit the discharge to the maximum rate set within this strategy.

Each plot will provide a means of flow control to achieve the specified discharge limit. This is most commonly achieved through the provision of a flow control device (e.g. Vortex control device, Hydrobrake etc.) installed within the final manhole before discharge.

There are numerous forms of surface water attenuation storage that could be employed on any of the proposed development plots.

Open grassed detention basins are one option, but have associated development land take constraints.

The other options are below ground structures, of which there are many such systems available on the market, such as:

- Plastic cellular "crate" storage systems
- GRP or, plastic structured wall storage tanks
- Concrete storage tanks
- Lined/unlined permeable paving storage (permeable sub-base)
- Large diameter pipes
- A combination of any of the above to meet the overall target

These structures would be situated at the appropriate place on the plot to suit the proposed layout and also the position and invert level of the allocated discharge point.

For the purposes of this report and the associated drawings and calculations, the minimum storage volume and plan area of a storage structure is shown on the proposed drainage drawing to indicate the scale of provision required on that plot and to show that it can be realistically achieved. This is based on a tank of 95% voids and 1m tank depth with 0.75m minimum cover over.

6.7 Road Network and Site-Wide Infrastructure

For areas that lie outside the proposed development plots, such as the internal road network and shared landscape areas the drainage strategy is to utilise the existing means of drainage, with no further infrastructure or flow restriction to be provided. These areas will drain as they do in the present state.

6.8 Ownership and Maintenance

On-plot drainage infrastructure will be the responsibility of the plot owner / tenant

Infrastructure outside of the individual development plots will be the responsibility of the estate management company

Typical maintenance activities on the surface water drainage infrastructure are:

- Regular visual inspections and drainage, watercourses, channels
- Road and car park gully clearance
- Landscape related maintenance on channels and outfalls to avoid obstructions
- Drainage inspection and cleaning
- Periodic liaison with Wessex Water on foul drainage system performance (pumping)
- Storage tank survey and cleaning
- Flow control device inspection and maintenance

6.9 Approvals and Consents

The proposals set out in this drainage strategy are subject to planning consent, which will include the lead local flood authority's approval. The surface water drainage network does not communicate with any of Wessex Water's public sewer network. The surface water discharges to the local watercourse network are already in place and will remain unchanged.

6.10 Plot Designer Requirements

The plot designer will need to respect the following drainage constraints and requirements within the detailed design of the development on an individual plot

- Easement / exclusion zone for permanent structures over and near existing sewers. Local diversion is possible if absolutely necessary or beneficial)
- The maximum permitted discharge rate for that plot
- The drainage line into which the discharge is shown, although split discharges are possible.
- To confirm that any uncharted abandoned drainage lines or redundant drainage spurs encountered as part of the design of an individual plot are out of use, so they can be capped off or removed.

6.11 Phasing

The existing main drainage infrastructure is in place so the phasing of the development plots and their plot drainage infrastructure is not limited or prescribed. Each plot is able to connect and comply with the strategy independently of other plots.

Ideally, the remedial works identified within this report should be done at an early stage

6.12 Exceedance Flow

The drainage strategy and associated surface water flow attenuation systems are designed to limit the flows to the average annual flow rate from the current (largely undeveloped) state of the site. This restriction will be effective during all storms up to the Q100+40% storm event.

During storm events in excess of the Q100+40% event, the flow in the main drainage pipes will increase, but not flood. Considering the size of the main drainage pipes across the site there is unlikely to be any flooding as a result of surface water pipe capacity for storms well in excess of the Q100+40% event.

Exceedance flows (well in excess of the Q100+40% storm event) would pass over the surface and into the internal road network, where it would follow the west to east fall, towards the River Win.

Localised Flooding is more likely to occur as a result of pipe blockage or lack of maintenance on car parks etc. This can be avoided through good and regular maintenance and cleaning.

6.13 Water Quality

It is important to consider the impact of an extensive commercial-based development on the quality of the water collected, before its final discharge to the river. Roof water is not considered to be a risk to water quality, but the extensive planned car parking areas will need to be considered and any pollution risk mitigated.

For all proposed car parks over 50 cars (in total for a particular plot) a class 1 bypass oil separator with high level oil level alarm should be provided before the discharge to the surface water drainage system.

The use of permeable paving within car parks (lined or unlined) is another means of reducing the water quality risk if it suits the plot development layout and budget.

7. OTHER DEVELOPMENT CONSTRAINTS

The purpose of this section is to summarise the additional constraints to development relating to drainage. These need to be considered in the planning, design and implementation of any individual development proposal on all plots and also for any enabling works or site-wide preparation works.

- The existing main drainage infrastructure is being retained to serve the proposed development masterplan. No part of it is proposed to be moved or abandoned.
- The developable land within a plot is constrained by existing drainage lines and their associated easement. No permanent structure can lie within this zone although there is some reasonable flexibility to the proximity of the surface water drains as they are in private ownership.
- In addition to the easements, the location of existing service chambers and manholes that are shown on the topographic survey and should also be respected in the layout of the individual developments.
- Access to the Wessex Water pumping stations for their tankers must be retained or re-provided.
- The drainage of the internal access roads will be as per the current state
- Existing ditches and watercourses to the boundaries of the site will also remain unaltered
- The existing pond within the grassed area is not an active part of the drainage network, so any works to this feature as part of the masterplan has no effect on the drainage strategy.
- This report does not cover other below ground constraints related to existing utilities, distribution ducting across the estate, effluent discharge pipework and other below ground tanks, pits and chambers.



8. CONCLUSIONS

8.1 Foul Water Strategy

An extensive existing public and part-private foul water drainage network is currently in place at the site, which is operational and suitable for long-term re-use.

Some remedial works on this system are required and should be carried out within the short term future, ideally as part of an enabling works contract.

The proposed development and its individual plots will discharge to these existing sewers, whilst complying with easement, flow rate and connection point requirements set out in this report.

The existing private and public foul drainage infrastructure at the site is capable of serving the proposed development. Sewer connection points and allowable discharge rates have been allocated for all proposed development plots.

Wessex Water have confirmed that they have no issues with the masterplan in principle, in relation to current available sewerage and water supply capacity.

8.2 Surface Water Strategy

An extensive existing private surface water drainage network is currently in place at the site, which is operational and suitable for long-term re-use.

Some remedial works on this system are required and should be carried out within the short term future, ideally as part of an enabling works contract.

The proposed development and its individual plots will discharge to these existing sewers, whilst complying with easement, flow rate and connection point requirements set out in this report.

The existing private surface water drainage infrastructure at the site is capable of serving the proposed development. Drainage connection points and allowable discharge rates have been allocated for all proposed development plots. The total surface water runoff discharge rate from the proposed development will be less than that of the former development and equal to that of the current state of the site. The overall surface water flood risk to the site and the wider area is reduced.

