Technical Note

Envireau Water, Cedars Farm Barn, Market Street,
Draycott, Derbyshire, DE72 3NB

To:	Herefordshire County Council	From:	Lee Clarke
Ref:	*P:\S&A Marden SAWA FRA (1783)\Reporting\PR\PR Res Dev.docx*	Pages:	3 + Appendix A
Re:	**Response to Planning**	Date:	14/09/2017

SITE:	**Volunteer Inn, Walkers Green, Marden, HR1 3ET**
TYPE:	**Outline**
DESCRIPTION:	**Site for residential development (family housing) for up to 75 dwellings (comprising open market and affordable housing [including starter homes]), together with a new vehicular and pedestrian access, on-plot car parking, supporting infrastructure and facilities, amenity open space, landscaping and a sustainable urban drainage system.**
APPLICATION NO:	**163157/F**
GRID REFERENCE:	**OS 352068, 248057**
APPLICANT:	**S&A Produce (UK) Limited**
AGENT:	**Aspbury Planning Limited**

Introduction

Envireau Water have produced a flood risk assessment and drainage strategy for the aforementioned planning application. This has been reviewed by WSP Parson Brinckerhoff (WSP) on behalf of Herefordshire County Council (HCC). WSP provided a review document (Appendix A) and made recommendations that further information is provided prior to the HCC granting planning permission for the development.

These recommendations are provided below:

- Clarification of the surface water drainage strategy to address the points raised in this response, namely:
  - Routing of the existing ditch to the north-east of the site through an existing drainage system;
  - Use of the proposed attenuation pond to the north-west of the site to manage runoff from the Family Public House development plot;
  - Routing of discharge from the proposed attenuation pond to the north-west of the site through the proposed Agricultural Workers Accommodation development plot;
  - Location of proposed below ground sewerage outside of the site boundary within the highways verge;
  - Feasibility to connect to an existing culverted drain.
  - Confirmation that the existing 100mm diameter foul sewer has sufficient capacity to cater for this development.
  - Proposed approach for the adoption and maintenance of surface water and foul water drainage systems.

Clarification of the surface water drainage strategy to address the points raised in this response, namely:

- **Routing of the existing ditch to the north-east of the site through an existing drainage system;**

The eastern attenuation basin will discharge to an existing ditch that in turn drains through two existing ponds to the north-east of the site. These ponds form part of an existing drainage system that collects runoff from farmland to the east of the site. The farmland is for Brook Farm and is under the ownership of the applicant, S&A Produce (UK) Limited.

- **Use of the proposed attenuation pond to the north-west of the site to manage runoff from the Family Public House development plot;**

It is proposed that the redevelopment of the Family Public House will require a minor component of additional attenuation storage. A simple drainage route from the Public House to the western attenuation basin can be instigated. Therefore, it is proposed that the storage attenuation requirement for the Family Public House development is provided in the western attenuation basin.

- **Routing of discharge from the proposed attenuation pond to the north-west of the site through the proposed Agricultural Workers Accommodation development plot;**

The route of discharge from the western section of the site will drain to the attenuation basin to the north-west of the site. This attenuation basin is located within the boundary of the Agricultural Workers Accommodation development plot (AWAdp). However, this attenuation basin will not serve to attenuate runoff from the AWAdp.

The north-west attenuation basin will only serve to attenuate runoff from the western section of the family housing plot and the Family Public House development.

- **Location of proposed below ground sewerage outside of the site boundary within the highways verge;**

It is proposed that a new drain is constructed that is located in the highway verge of the C1120 road that will connect into the existing drain at the entrance to Brook Farm.

No consultation with the Councils' highway authority has been undertaken in relation to the placement of a newly constructed drain. It is proposed that this consultation be undertaken as part of any reserved matters application.

- **Feasibility to connect to an existing culverted drain.**

Topographic data from the site shows that a gravity fall is achievable from the north-western attenuation basin to the C1120 road. At present, we are not aware of any existing highway drain that could be connected into at this location and therefore as noted above, it is proposed that a new drain is constructed in consultation with the Council's highway authority.

- **Confirmation that the existing 100mm diameter foul sewer has sufficient capacity to cater for this development.**

  The existing 100mm pipe accommodates foul flows from Woodbine Close and from the Brook Farm pumping main serving the current agricultural workers accommodation (AWA). There will be no material change to the pumped volumes from the AWA. Welsh Water have been approached to assess the additional loadings that would occur for an additional 76 dwellings.

  Welsh Water have stated that the foul flows can be accommodated within the public network. It is proposed that this is re-assessed as part of any reserved matters application.

- **Proposed approach for the adoption and maintenance of surface water and foul water drainage systems.**

  It is proposed that the surface water system is to be maintained privately by the applicant and by a management company. It is proposed that the foul water system is adopted by Welsh Water.

APPENDIX A

SITE:	Volunteer Inn, Walkers Green, Marden, HR1 3ET
TYPE:	Outline
DESCRIPTION:	Site for residential development (family housing) for up to 75 dwellings (comprising open market and affordable housing [including starter homes]), together with a new vehicular and pedestrian access, on-plot car parking, supporting infrastructure and facilities, amenityopen space, landscaping and a sustainable urban drainage system
APPLICATION NO:	163157
GRID REFERENCE:	OS 352068, 248057
APPLICANT:	S&A Produce (UK) Limited
AGENT:	Aspbury Planning Limited
DATE OF THIS RESPONSE:	04/11/2016

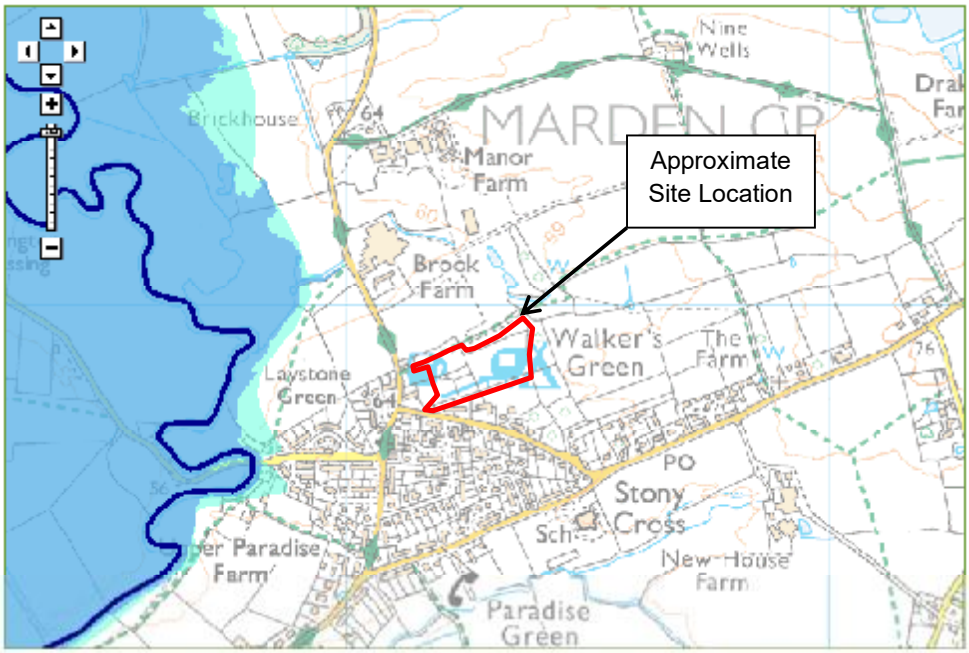
Introduction

This response is in regard to flood risk and land drainage aspects, with information obtained from the following sources:

- Application for outline planning;
- Integrated Masterplan, Drawing No. B6144_(PL)_05_D;
- Application Site Plan, Drawing No. B6144_(PL)_02;
- Design and Access Statement, dated August 2016;
- Flood Risk Assessment, dated September 2016.

Site Location

Figure 1: Environment Agency Flood Map for Planning (Rivers and Sea), October 2016



Overview of the Proposal

The Applicant proposes the construction of 75 dwellings with associated parking, garages and open space, supporting infrastructure and facilities, access and roads. The site is stated to occupy an area of 2.9ha and is located in Flood Zone 1. The topography of the site is relatively flat, with land falling from the southern boundary of the site towards the north-east and north-west. The site is currently greenfield.

Fluvial Flood Risk

Review of the Environment Agency's Flood Map for Planning (Figure 1) indicates that the site is located within the low risk Flood Zone 1. Flood Zone 1 comprises land assessed as having less than a 1 in 1,000 annual probability of river flooding.

As the site is greater than 1ha, the planning application should be supported by a Flood Risk Assessment (FRA) undertaken in accordance with National Planning Policy Framework (NPPF) and its supporting Planning Practice Guidance. This is summarised in Table 1.

Table 1: Scenarios requiring a FRA

	Within Flood Zone 3	**Within Flood Zone 2**	**Within Flood Zone 1**
Site area less than 1ha	FRA required	FRA required	FRA not required*
Site area greater than 1ha	FRA required	FRA required	FRA required

**except for changes of use to a more vulnerable class, or where they could be affected by other sources of flooding*

The Applicant has submitted a FRA which confirms the site's location in Flood Zone 1 and therefore focusses on flood risks from non-fluvial sources. The submitted FRA addresses several sites in close proximity to this application for outline permission – we have only considered information relevant to site PA2 "Outline Planning Application for a new Family Housing residential development".

The Planning Practice Guidance to NPPF identifies five classifications of flood risk vulnerability and provides recommendations on the compatibility of each vulnerability classification within each of the Flood Zones. The FRA submitted by the Applicant appropriately identifies the development as not significantly vulnerable to flooding and suitable in Flood Zone 1.

Other Considerations and Sources of Flood Risk

The Applicant's FRA considers the risk of flooding on site from all sources, including surface water, groundwater, manmade sources and sewers.

The Applicant's FRA states that there is a very low risk of flooding to the site from groundwater and that there are no recorded instances of groundwater flooding in the vicinity of the site. We concur with this assessment.

The Applicant's FRA concludes that the risk of flooding from sewerage systems is low. We concur with this assessment.

Review of the EA's Risk of Flooding from Surface Water map (Figure 2) identifies an overland flow route adjacent to the eastern site boundary and significant ponding to the north-east of the site. This is assessed within the Applicant's FRA and the layout of the development reflects the potential risk – with residential properties set back from the eastern site boundary and woodland to the north-east. This proposal should be followed through into any subsequent reserved matters application.

Review of the EA's Risk of Flooding from Surface Water map also indicates surface water ponding in the south-west of the site most likely associated with a local depression in site topography. The Applicant's FRA does not identify this risk but given that the probability of flooding at this location is 'low' this is not considered to pose a significant risk or constraint to the development, or pose increased risk to people and property elsewhere.

Figure 2: Environment Agency Risk of Flooding from Surface Water Map, October 2016

Surface Water Drainage

In accordance with the NPPF, Non-Statutory Technical Standards for Sustainable Drainage Systems and Policy SD3 of the Core Strategy, the drainage strategy should incorporate the use of Sustainable Drainage (SUDS) where possible. Given the size of this proposed development, the Applicant is expected to demonstrate best practice SUDS techniques. The Applicant's FRA demonstrates a commitment to the implementation of SUDS which is welcomed.

Best practice SUDS promote the use of infiltration features in the first instance. If drainage cannot be achieved solely through infiltration due to site conditions or contamination risks, the preferred options are (in order of preference): (i) a controlled discharge to a local watercourse, or (ii) a controlled discharge into the public sewer network (depending on availability and capacity). The rate and volume of discharge should strive to provide betterment and at minimum be restricted to the pre-development greenfield values.

The Applicant has applied the hierarchy of best practice SUDS and has considered the potential to infiltrate surface water into the ground. The FRA references soils mapping and BGS data which indicate that the site is located on clayey soils with impeded drainage. The Applicant concludes that infiltrating surface water into the ground is therefore not a viable means of surface water discharge and therefore proposes to discharge surface water to the River Lugg located 250m to the west of the site. Whilst we agree with this proposal in principal, we recommend that infiltration testing is undertaken prior to construction to confirm the assumed ground conditions, and that infiltration is promoted as far as practicable through the use of unlined attenuation features to reduce runoff during smaller rainfall events and provide valuable treatment of the 'first flush'. Prior to construction the Applicant will be required to confirm that the base of any unlined attenuation feature is located a minimum of 1m above groundwater levels.

The Applicant states that the development will introduce 1.34ha of impermeable surface, representing 47% of the total site area. Surface water generated from the impermeable areas of the site will be conveyed to attenuation basins by a sub-surface gravity drainage system. Two attenuation basins are proposed in the north-east and north-west of the site to reflect natural drainage patterns and low points within the site.

With reference to the Applicant's current proposed strategy, the Applicant has estimated greenfield rates using the IH124 methodology as outlined in the EA/DEFRA "Preliminary rainfall runoff management for developments", R&D Technical Report W5-074/A/TR/1 Revision E. This method of estimation is considered acceptable in accordance with best practice guidance laid out in the CIRIA SuDS Manual. The Applicant has calculated greenfield runoff rates to be 2.72 l/s/ha during the 1 in 1 year rainfall event and 6.98 l/s/ha during the 1 in 100 year rainfall event, with a QBAR rate of 3.20 l/s/ha.

The Applicant states that surface water runoff will be attenuated to a rate equal to or less than the estimated QBAR greenfield runoff rate at all times, and that sufficient attenuation will be provided to cater for the 1 in 100 year event with a 30% increase in rainfall intensity to accommodate climate change effects. The proposed approach is not strictly in accordance with the Non-Statutory Technical Standards for Sustainable Drainage Systems that states that the peak rate and volume of runoff during the post-developed 1 in 1 year event should not exceed the peak rate and volume of runoff during the equivalent greenfield event. However, as the Applicant is proposing to limit all runoff to the estimated QBAR greenfield rate we acknowledge the betterment that this will provide during events larger than the QBAR event and do not believe that this would pose notable increase in flood risk during events smaller than the QBAR event.

In Table 3 of the FRA, the Applicant has provided attenuation storage calculations for attenuation of the 1 in 100 year event with discharge limited to the equivalent 1 in 100 year greenfield discharge rate, and with a required 'uplift' in attenuation storage provision required to attenuate the 1 in 100 year event to the equivalent QBAR greenfield discharge rate. We believe that an error has been made in these calculations as the 'uplift' calculated by the Applicant appears to be the storage required to attenuate the QBAR event to the equivalent QBAR greenfield discharge rate, rather than the storage required to attenuate the 1 in 100 year event to the QBAR equivalent greenfield discharge rate. We would expect the additional storage required to attenuate the 1 in 100 year event to the QBAR greenfield discharge rate to be much greater than that proposed by the Applicant in Table 3. Given the availability of green space in the vicinity of the proposed attenuation basins we are confident that additional attenuation can be provided. However, we recommend that, as part of any reserved matters application, the Applicant re-calculates the storage requirements based on QBAR greenfield discharge rates.

The Applicant has included a 30% increase in peak rainfall intensity to allow for climate change effects, halfway between the recommended EA guidance of 20% for a central estimate and 40% for an upper end estimate for developments with a 100 year design life. Whilst we have no issue with the Applicant's use of the 30% allowance within their attenuation calculations, we recommend that as part of any reserved matters application that the Applicant submits calculations to demonstrate how the proposed drainage system would perform with a 40% increase in rainfall intensity without posing unacceptable flood risk to the site or elsewhere.

The Applicant states that attenuated discharge from the attenuation basins will be drained into existing open drainage ditches that ultimately discharge to the River Lugg. Figure 5 of the FRA illustrates the proposed strategy and raises a number of issues that we recommend are addressed prior to granting outline planning permission:

- The eastern attenuation pond is indicated to drain to an existing ditch that in turn is indicated to drain through two existing ponds to the north-east of the site located within the area of woodland. It is not clear if these ponds form part of an existing drainage system and it is recommended that this is clarified by the Applicant.
- The western attenuation pond is indicated to drain via below ground sewers into an attenuation pond proposed as part of an adjacent development plot. This contradicts the FRA that states that the proposed development site will have a drainage system independent of the adjacent development plots.
- Discharge from the western attenuation pond is indicated to be conveyed within the highway verge to a culverted drain to the north of the site adjacent to Brook Farm. This land is not within the site boundary and therefore this must be discussed with the Herefordshire Council highways authority. The Applicant has also provided no indication if a gravity connection to the existing culverted drain is feasible.
- Herefordshire Council Highways have advised that the applicant would need to demonstrate by means of a topography survey that all of the area served by the proposed surface water sewer network ultimately drains to the existing highway drainage ditch. In this case the applicant will have a riparian right to discharge surface water into the ditch. A full survey of the existing highway drains will be required to help determine whether a connection can be made. It is likely that the developer may need to enhancement or restore some sections of highway drainage to ensure that they are fit for purpose.
- Figure 5 and the text within the FRA suggests that the proposed attenuation pond in the north-west of the site may receive runoff from the Family Public House development which is contradictory to the proposed strategy to have independent drainage systems for each plot.

The Applicant has not confirmed the proposed adoption and maintenance arrangements for the surface water drainage system and we recommend that this is provided prior to the Council granting outline planning permission.

Foul Water Drainage

The Applicant has proposed that foul flows from the site will be discharged to the Welsh Water public foul sewer in Woodbine Close via a pumped system due to local topography. The sewer is stated to be a 100mm diameter sewer which, in our opinion, appears to be insufficient to cater for a development of this size. We recommend that the ability of this sewer to cater for this development is clarified with the Applicant and Welsh Water.

The Applicant has contacted Welsh Water to confirm that the existing Moreton on Lugg wastewater treatment works can accommodate the additional flows from the proposed development.

The Applicant has not confirmed the proposed adoption and maintenance arrangements for the foul water drainage system and we recommend that this is provided prior to the Council granting outline planning permission.

Overall Comment

We recommend that the following information is provided by the Applicant prior to the Council granting planning permission for this development:

- Clarification of the surface water drainage strategy to address the points raised in this response, namely:
    - Routing of the existing ditch to the north-east of the site through an existing drainage system;
    - Use of the proposed attenuation pond to the north-west of the site to manage runoff from the Family Public House development plot;
    - Routing of discharge from the proposed attenuation pond to the north-west of the site through the proposed Agricultural Workers Accommodation development plot;
    - Location of proposed below ground sewerage outside of the site boundary within the highways verge;
    - Feasibility to connect to an existing culverted drain.
- Confirmation that the existing 100mm diameter foul sewer has sufficient capacity to cater for this development.
- Proposed approach for the adoption and maintenance of surface water and foul water drainage systems.

We have also highlighted potential issues with the proposed sizing of the attenuation ponds to limit surface water discharge to a maximum rate equal to the equivalent QBAR greenfield runoff rate during all events up to the 1 in 100 year event and allowing for the potential effects of climate change, although believe that this issue can be addressed as part of any subsequent reserved matters application.

We also recommend that the submission and approval of detailed proposals for the management of flood risk/disposal of surface water runoff and foul water from the development is included within any reserved matter associated with the permission. The detailed drainage proposals should include:

- Demonstration that opportunities for the use of SUDS features have been maximised, where possible, including maximising infiltration potential through unlined storage and on-ground conveyance and storage features in soils with a low permeability;
- A detailed surface water drainage strategy with supporting calculations that demonstrates there will be no surface water flooding up to the 1 in 30 year event, and no increased risk of flooding as a result of development between the 1 in 1 year event and up to the 1 in 100 year event and allowing for the potential effects of climate change;
- Evidence that the Applicant is providing sufficient storage and appropriate flow controls to manage additional runoff volume from the development, demonstrated for the 1 in 100 year event (6 hour storm) with an appropriate increase in rainfall intensity to allow for the effects of future climate change;
- Evidence that the Applicant has sought and agreed allowable discharge rates for the disposal of foul water and surface water runoff from the site with the relevant authorities;
- Demonstration of the management of surface water during extreme events that overwhelm the surface water drainage system and/or occur as a result of blockage;
- Demonstration that appropriate pollution control measures are in place prior to discharge.
- Confirmation of the proposed authority responsible for the adoption and maintenance of the proposed drainage systems.
- Details of any proposed outfall structures.

Any discharge of surface water or foul water to an ordinary watercourse will require Ordinary Watercourse Consent from Herefordshire Council prior to construction.