Engineers Comments Regarding Surface Water Drainage

Application Reference:	BN/132/24/HH	**Reviewer Reference:**	ADC/SB
Planning Officer:	Hebe Smith	**Date of Review:**	03/12/2024
Site Name:	29 Cherry Tree Drive Eastergate PO20 3RR		
Application Description:	Construction of a single-storey side extension to the existing eastern elevation.		
Assessment Number:	1 of 1		

Policy and Guidance Information

Arun District Council Surface Water Drainage Guidance - https://www.arun.gov.uk/surfacewater

Land Drainage Consent – https://www.westsussex.gov.uk/fire-emergencies-and-crime/dealing-with-extreme-weather/flooding/flood-risk-management/ordinary-watercourse-land-drainage-consent/ and https://www.arun.gov.uk/land-drainage-consent/

Arun District Council surface water pre-commencement conditions - https://www.arun.gov.uk/planning-pre-commencement-conditions

The SuDs Manual [C753] by CIRIA

Sustainable drainage systems: non-statutory technical standards' https://assets.publishing.service.gov.uk/media/5a815646ed915d74e6231b43/sustainable-drainage-technical-standards.pdf

Response	**Objection**

Critical Items for Surface Water Drainage Design Conditions

The failure to adequately address the following items will result in an objection to a surface water drainage design.

If any of these items are inadequately addressed by the submission, then their correction may result in a redesign of the surface water drainage scheme. A redesign is likely to have site wide implications such as the potential for storage structures to increase in volume or plan area.

Items are further elaborated upon in the attached comment tracker where necessary.

Further comments which are unlikely to impact the design methodology will be provided in the comment tracker, these relate to the detailed design. Unless clearly stated, it is considered that these additional comments are unlikely to result in a redesign of the system. These can be addressed following a second consultation to prevent unnecessary refusals.

Critical Item	**Reason**	**Status**
Winter groundwater monitoring data.	Adequate winter groundwater monitoring data must be supplied to evidence that infiltration designs have sufficient freeboard from the base of structures and the peak groundwater level.	**Not supplied**

	The same data is necessary to ensure that the potential for buoyancy has been adequately considered in attenuation designs.	
Winter infiltration testing data.	Adequate winter infiltration testing must be supplied to justify the proposed discharge method and design infiltration rates. Infiltration tests must be completed strictly in accordance with BRE DG 365, CIRIA R156 or a similar approved method. Testing depths must account for peak groundwater levels and correspond with the location and depth of proposed infiltration features. Designs must be based upon the slowest infiltration rate evidenced closest to a proposed infiltration feature. Average design rates will not be accepted. The results of incomplete tests should not be extrapolated to obtain design values for infiltration rates.	**Not supplied**
The hierarchy for sustainable drainage.	The proposed discharge method must accord with the SuDS hierarchy as given below. Evidence must be supplied to justify the proposed discharge method. 1. Rainwater reuse where possible. 2. Complete discharge into the ground (infiltration). 3. Hybrid infiltration and restricted discharge to an appropriate water body or surface water sewer. 4. Restricted discharge to an appropriate water body. 5. Restricted discharge to a surface water sewer. 6. Restricted discharge to a combined sewer. A water body may be defined as a river, watercourse, ditch, culverted watercourse, reservoir, wetland or the sea. **Engineers cannot support any proposed connection of surface water to the foul sewer.**	**Compliant but unproven.**

Calculations	Calculations for pre-development run off rates must be based upon the positively drained area only. Proposed discharge rates must not increase flood risk on site or elsewhere. Discharge rates must be restricted to QBAR or 2 l/s/ha, depending on whichever is higher.	**Not supplied**
	Designs must be based on the most recently available rainfall data at the time of conditions being applied. **FSR rainfall data will not be accepted.** FEH rainfall data is based upon more recent records and continues to be updated.	**Not supplied**
	Designs must use the correct climate change allowances at the time of determination of the outline or full planning application. CV values for all events must be set to 1. This includes summer, winter, design, and simulation events. The correct allowance for urban creep must be applied. Additional storage must be set to zero unless it can be evidenced where this is provided. Infiltration half-drain times must be less than 24 hours. Infiltration design rates must be applied to the sides of soakaways, or to the base of infiltration blankets. Design rates must not be applied to both the base and sides of infiltration structures. A surcharged outfall must be modelled.	**Not supplied**
Natural catchments design.	The submission must define the natural drainage characteristics within, and hydraulically linked to, the site and demonstrate that the drainage proposals will integrate with and not compromise the function of the natural and existing drainage systems. The condition, performance (including capacity where appropriate) and ownership of any existing site surface water drainage infrastructure must be accurately reported.	**Not supplied**

	Appropriate easements to watercourses and other services must be shown on all plans. Where there are areas of flood risk from any source on the site, it must be shown how a sustainable surface water drainage design can be accommodated on the site without conflicting with those areas of flood risk. Designs must replicate the natural drainage catchments of the site. All surface water drainage designs must therefore drain via gravity to corresponding points of discharge. **The use of pumps for surface water drainage is not sustainable and will not be supported**. .	
Plans	Plan areas, depths and levels of drainage infrastructure must accurately correspond with the supporting calculations.	**Not supplied**
Water quality benefits.	An assessment of water quality is necessary to evidence that the proposed design provides adequate treatment of surface water.	**Not supplied**
Trees and planting	There should be no conflict between surface water drainage infrastructure and existing or proposed trees or planting. The design must consider the potential growth of proposed trees and adequate mitigation must be provided to protect drainage infrastructure where conflict **cannot** be avoided.	**Not supplied**

Additional comments to the planning officer

The NPPF states that when determining any planning application, local planning authorities should ensure that flood risk is not increased elsewhere (paragraph 173 and 180e). The PPG guides local planning authorities to refer to 'Sustainable drainage systems: non-statutory technical standards' and detailed industry guidance like The SuDS Manual [C753] by CIRIA to guide decisions about the design, maintenance, and operation of sustainable drainage systems for non-major development.

This consultation has been primarily informed by The SuDS Manual.

A Lidsey Drainage Impact Assessment has been submitted which indicates that surface water will be drained via a soakaway. Nothing has been submitted to evidence that draining by infiltration is viable or that there is enough space on the site to accommodate a soakaway.

Ground conditions and infiltration potential are very variable in Barnham and Eastergate. Infiltration can be possible, but in parts, groundwater can be high or infiltration rates so low as to make infiltration unviable.

The site is fronted by an area at risk of surface water flooding, on the 0.1% Annual Exceedance Event (with no allowance for climate change) on Fontwell Avenue. It is also in the Lidsey Wastewater Treatment Catchment [WWTC] Area which is the subject of a surface water management plan.

If infiltration is not viable, then alternative sustainable means of draining the site are summarised as follows:

1. Infiltration – not investigated and space may be constrained.
2. To a watercourse – none available.
3. To a surface water sewer – none available.
4. To a highway drainage system – Permission cannot be assumed. Generally, applications to connect surface water to highway drainage are strongly resisted.
5. To a combined sewer – none available.

Surface water must not be discharged into the foul sewer. The foul sewer is not a recognised disposal location in the SuDS Manual, Approved Document H, or the NPPG **[Flood risk and coastal change para 056]**. It is important to recognise that the foul and combined sewer networks are defined by the public sewer records held by Southern Water Services Ltd.

The public sewer in the Lidsey Wastewater Treatment Catchment Area has a history of flooding and any surface water added to this system should be assumed to increase flood risk.

Further information is required to demonstrate how the existing site drains surface water. If infiltration is not viable and connection to alternative system cannot be achieved, it may not be able to drain surface water sustainably.

In the absence of any evidence of a viable surface water drainage design, we cannot assess if flood risk will be increased by the proposed development. Therefore, this application does not accord with the NPPF as set out above.

Overcoming our objection

As this is not a holding objection or a request for further information, I am not listing requested conditions. If you are minded to approve this application, please reconsult me for a list of suggested conditions to ensure that the development is adequately drained and does not increase flood risk elsewhere.

The imposition of conditions at this stage rather than overcoming the objection could result in a circumstance where the condition cannot be discharged. In the event of attaching a condition that cannot be discharged, permission may be invalid.

If the planning officer is minded to allow the applicant additional time to submit further documents to support this application, then the following evidence may overcome our objection. Please do not submit further documents without prior discussion with the planning officer as to whether it will be possible for these to be assessed or influence their determination.

1. Provide evidence of a sustainable surface water disposal location. Including but not limited to:

- Winter groundwater monitoring and winter infiltration testing,

If infiltration is not viable then present evidence of this in addition to:

- Permission in principle to connect surface water from the site to an alternative disposal location with a capacity check if appropriate. Please note, evidence of permission to connect surface water to the Southern Water public foul sewer will not be acceptable.

2. Evidence that a sustainable surface water drainage design can be accommodated within the proposed site layout. This will require a drainage statement, supporting calculations and a preliminary drainage layout (including connection levels) as a minimum.

A reduced site-specific version of our full surface water drainage design checklist is provided below. This has been edited to remove elements that are not applicable to this site, either due to the scale of the proposal or the method of disposal. The checklist is provided to assist the applicant and designer in preparing a revised design to meet our requirements. It is applicable to 29 Cherry Tree Drive only.

29 Cherry Tree Drive Designer Checklist

Ground Investigation Results

Comment: To be provided prior to determination.

Groundwater monitoring
☐ Plan showing location of monitoring points provided.
☐ Depths of holes detailed.
☐ Dates of observations and depth to groundwater recorded.
☐ Evidence of the strata within borehole or monitoring pits provided.

Requested to aid speed of assessment
☐ Plan showing the peak groundwater levels at each monitoring point in mAOD.
☐ Peak groundwater levels recorded in metres below ground level and mAOD.
☐ If in an area of possible tidal influence, provide a comparison of readings against tide times/levels.

Infiltration testing
☐ Completed strictly in accordance with BRE DG 365, CIRIA R156 or a similar approved method.
☐ Plan showing location of trial pits provided.
☐ Pit dimensions provided.
☐ Depths of testing provided.
☐ Dates, times and readings of each test recorded.
☐ Calculations for the infiltration rate for each test provided.
☐ Evidence of the strata within trial pits provided.
☐ Test locations, and depths correspond with the expected location and depths of proposed infiltration features.

Requested to aid speed of assessment
☐ Depths of testing provided in m below ground level and mAOD.

Other
As appropriate, dependent upon specific site conditions
☐ Appropriate geotechnical advice is sought where infiltration may have negative effects due to the ground conditions on the site – please see our guidance linked above for information.

Surface Water Drainage Statement

Comment: To be provided prior to determination.

Disposal method (Select as appropriate)
☐ Rainwater reuse is proposed where possible.
☐ Infiltration is proposed and maximised wherever possible.
☐ Restricted discharge to a public or private highway drainage network is proposed where a full infiltration design is not possible and there are no nearby water bodies or surface water sewers.

Disposal method justification
☐ Infiltration has been adequately investigated, in winter, at appropriate and varying depths where appropriate, above peak recorded winter groundwater levels at the given location.
☐ Public and private downstream highway drainage networks are investigated (location, mapping, network, flow direction, ownership/responsibility, depth, capacity, and condition).
☐ Any relevant permissions or legal agreements from asset or landowners that are needed are identified and evidence of consents provided.

Requested to aid speed of assessment
☐ Any previous relevant correspondence or pre-application advice from the Local Planning Authority [LPA] or the Lead Local Flood Authority [LLFA] regarding the surface water drainage design is included with the statement.

Existing Site
Essential
☐ It is clear what the natural drainage characteristics of the site and hydraulically linked areas are.
☐ Natural flow paths are identified on a plan (where applicable).
☐ Existing site drainage features are investigated – condition, performance, and ownership.
☐ Any appropriate easements to infrastructure are investigated.
☐ Existing and future flood risk from any source is detailed.

It is suggested that the above is achieved with the following, which may be combined where appropriate:
☐ An existing topographical plan.
☐ An existing site surface water drainage plan (where applicable).
☐ Flood maps (fluvial, tidal, pluvial, groundwater, sewer, and reservoir) are supplied (or Flood Risk Assessment referred to).
☐ Confirmation and surveys of any existing drainage infrastructure on the site.
☐ Full details of any known flooding on the site

Proposed Design
Essential

☐ Statement confirming the proposed design criteria including fixed design calculation inputs for the SuDS system. Examples include:

- Climate change allowances,
- Urban creep allowance,
- CV values,
- Rainfall data,
- MADD factor or additional storage.

☐ Natural catchments are followed.
☐ The design is gravity based with no use of pumps.
☐ Where there is existing drainage infrastructure on the site it is clearly explained or illustrated what is being retained, upgraded, or removed.
☐ Details of necessary off-site works and consents are provided.
☐ If the surface water drainage is designed to flood in the 1% Annual Exceedance Probability [AEP] + Climate Change Allowance [CCA] event, then the flood volume is contained safely on site without flooding any part of a building or utility plant susceptible to water or affecting safe access or egress.

☐ The design provides and evidences interception drainage and is able to capture and retain on site the first 5mm of the majority of all rainfall events.
☐ Water quality and treatment is adequately assessed – with an assessment appropriate for the scale and proposed use of the site.
☐ Adequate freeboard is provided between the top water level of any open storage features and the top of the bank.
☐ There are no clashes with other infrastructure.
☐ Self-cleansing velocities are achieved where pipes are proposed.

☐ 1m freeboard is provided between peak groundwater levels and the base of any infiltration feature.

☐ The proposed discharge rate is explained and justified (for attenuation designs).
☐ Where discharge is proposed to a public surface water sewer, a capacity check confirming that the sewer can receive the proposed flows is submitted.
☐ Where there is a risk that the base of an attenuation feature may penetrate peak groundwater levels, additional mitigation measures to prevent groundwater ingress are incorporated into the design and construction method statement.
☐ Where there is a risk that the base of an attenuation feature may penetrate peak groundwater levels the effects of buoyancy have been considered in the design.

☐ The justification and criteria for tree root avoidance and mitigation measures is clear, referencing adopting body standards where applicable.

Impermeable Area/Catchment Plan

Comment: May be combined with the drainage layout. To be provided prior to determination.

Essential
☐ An impermeable area plan is provided showing all positively drained areas including open surface water storage plan areas.

Preferred
☐ Impermeable areas are shown in m^2 on the impermeable areas plan(s).

☐ Demarcated impermeable areas correspond with the distribution of those areas in the supporting calculations.

Surface Water Drainage Calculations

Comment: To be provided prior to determination.

General

☐ The most recently applicable, or previously agreed FEH rainfall data is used.
☐ CV values for all events are set to 1. This includes summer, winter, design, and simulation events.
☐ The correct climate change allowances, appropriate for the full lifetime of the development, have been applied to all calculations.
☐ A 10% allowance for urban creep is applied to all residential roof areas.
☐ 100% Annual Exceedance Probability [AEP] + Climate Change Allowance [CCA] (1 in 1 year) event calculations provided.
☐ 10% AEP + CCA (1 in 10 year) event calculations provided showing that the incoming pipe to any infiltration feature is above this level.
☐ 3.33% AEP + CCA (1 in 30 year) event calculations provided showing that the full surface water volume is contained within the designed system without flooding.
☐ 1% AEP + CCA (1 in 100 year) event calculations provided showing that the full surface water volume is contained safely on site, without flooding any part of a building or utility plant susceptible to water or affecting safe access or egress.

Infiltration

☐ Half drain times do not exceed 24 hours for the 10% AEP + CCA and 1% AEP + CCA events.
☐ If half drain times exceed 24 hours for the 1% AEP + CCA event, then advice and agreement from the LPA has been sought and submitted.
☐ The most precautionary design infiltration rate is used.
☐ Design infiltration rates are applied to the sides of soakaways only.
☐ Design infiltration rates are applied to the base of permeable paving, infiltration blankets or basins only.
☐ Where the design infiltration rate is applied to the base an appropriate factor of safety is applied.

Attenuation and Restricted Discharge

☐ Greenfield run off rates are based upon the positively drained area of the site only.
☐ Discharge rates are restricted to QBAR or 2 l/s/ha, depending on whichever is higher, for all storms up to the 1% AEP + CCA event.
☐ Half drain times and available capacity in the drainage system for subsequent storms are considered.
☐ A surcharged outfall to a watercourse or sewer has been modelled. The surcharge level is the 1% AEP + CCA flood event for the receiving watercourse, or to the top of the bank if appropriate hydraulic modelling is not available.

Requested to aid assessment
☐ FEH22 point descriptors for the site are provided.

Drainage Plans and Specifications

Comment: Preliminary drainage layout may be provided prior to determination with full details and specifications agreed vis condition if necessary. The preliminary layout must include levels at connection to a disposal location if applicable.

Essential
Plans are provided showing:
☐ The proposed design within the proposed site layout.
☐ Existing and proposed levels.
☐ Exceedance flow management routes.
☐ Details of connections to sewers.

These plans must be of sufficient detail that a reviewer can be confident that the design can be constructed without flood risk being increased on site or elsewhere.

Specifications are required for all materials used in the design. We suggest that this is best achieved and illustrated with site specific construction detail drawings. The combination of construction details, with plans and sections, ensure that the proposed standard of construction will facilitate adoption and maintenance by an appropriate body and have structural integrity.

The following checklist is designed to demonstrate the level of detail required:

Easements
☐ Any appropriate easements as stipulated by any public or private utility provider shown on all plans.
☐ Infiltration features (aside from permeable paving that does not take any extra impermeable catchment such as a roof) are shown at least 5m from buildings or structures.
☐ Maintenance easements are shown from the top of the bank from all open SuDS features on all plans.
☐ Existing trees and their root protection zones are shown on any drainage layout.
☐ Proposed trees and appropriate easements are shown on any drainage layout.

Detail
☐ It can be clearly determined what a pipe's diameter, pipe materials, gradients, flow directions and invert levels are from the plans.
☐ It can be clearly determined what an inspection chamber or manhole's cover level, invert level, cover loading grade and sump depth (where applicable) are from the plans.
☐ All infiltration or attenuation features (including permeable paving) are clearly labelled with their dimensions, invert/base levels and cover levels.
☐ Control structures are labelled with discharge rates, hydraulic head, invert and cover levels and ideally model number.
☐ Measures to protect drainage from tree root damage are clearly shown on any drainage layout.
☐ If the 1% AEP + CCA event floods, then the extent and depth of the flooding is shown on a site plan. This plan includes proposed external ground levels and finished floor levels of buildings.
☐ Potential flow routes off site are shown. The plan also includes proposed external ground levels, finished floor levels of buildings and designed slopes on all impermeable surfaces such as highways or car parks.
☐ Cross sections and long sections of all open features are provided.
☐ Construction detail drawings are site specific.
☐ Construction detail drawings are provided for all components including but not limited to:

- ☐ Infiltration structures
- ☐ Attenuation structures

- ☐ Manholes/inspection chambers
- ☐ Catchpits/silt traps
- ☐ Flow control devices
- ☐ Permeable paving
- ☐ Channel drains
- ☐ Pipe bed and surround
- ☐ Pipe to pipe connections
- ☐ Filter strips or drains
- ☐ Bio-retention systems
- ☐ Tree pits and measures to protect drainage from root incursion
- ☐ Water treatment features
- ☐ Measures to protect drainage from tree roots.
- ☐ Water butts or alternative methods of water reuse – also to be shown on plans.

<u>The following items are requested to aid assessment or confidence in construction:</u>

☐ Where features have a non-uniform plan area, a plan showing the coordinates of the perimeter is provided.
☐ All drainage infrastructure is labelled to correspond with the supporting calculations.

This checklist is designed to aid an applicant with their submission. The list is not exhaustive, and our engineers may request additional information to enable them to review a proposal to their satisfaction.

The checklist may also request information that an applicant does not feel is relevant to their submission. In this case the applicant can provide an explanation as to why they have omitted certain information in their drainage statement. However, the appraising engineer reserves the right to request this information if they believe it is necessary for their review.

[redacted]

From: Nicola Oktay on behalf of Planning.Responses
Sent: 04 December 2024 09:46
To: Planning Scanning
Subject: FW: Planning Consultation on: BN/132/24/HH
Attachments: BN-132-24-HH - 29 Cherry Tree Drive.docx

Drainage Engineers response

Nikki Oktay
Planning Receptionist, Planning Department

T: 01903 737965
E: Nicola.Oktay@arun.gov.uk

Arun District Council, Civic Centre, Maltravers Rd
Littlehampton, West Sussex, BN17 5LF
www.arun.gov.uk

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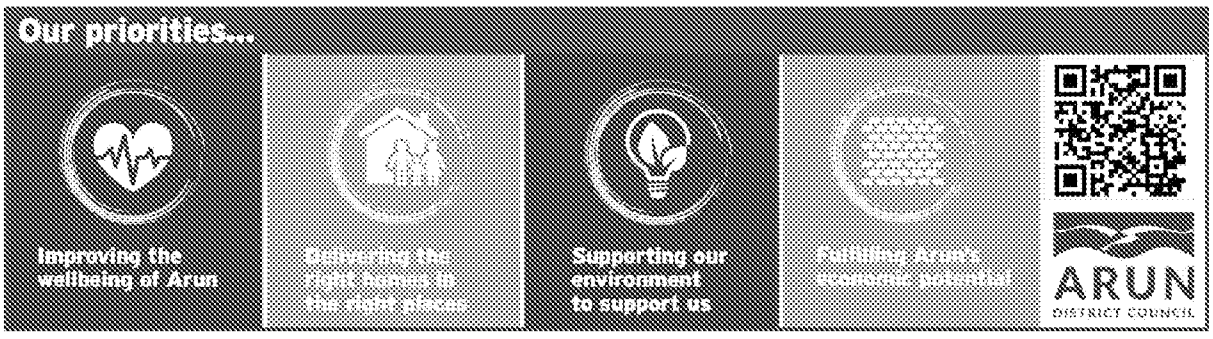


From: Sarah Burrow <Sarah.Burrow@arun.gov.uk>
Sent: 03 December 2024 10:56
To: Planning.Responses <Planning.Responses@arun.gov.uk>
Cc: Hebe Smith <Hebe.Smith@arun.gov.uk>; Paul Cann <Paul.Cann@arun.gov.uk>
Subject: RE: Planning Consultation on: BN/132/24/HH

Hi Hebe,

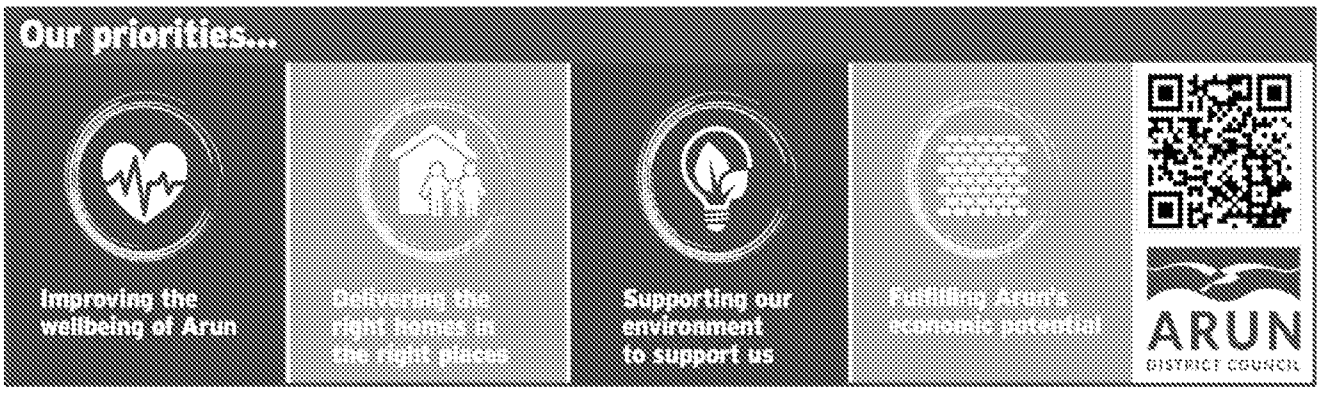
Find my consultation – an objection – attached. Apologies for the delay in response.

Kind regards

Sarah Burrow
Flood Risk and Drainage Engineer, Coastal Engineers and Flood Prevention

T: 01903 737815
E: sarah.burrow@arun.gov.uk

[redacted]



From: Planning.Responses <Planning.Responses@arun.gov.uk>
Sent: 14 October 2024 12:34
To: Land Drainage <Land.Drainage@arun.gov.uk>
Subject: Planning Consultation on: BN/132/24/HH

To: **Engineers (Drainage)**

NOTIFICATION FROM ARUN DISTRICT COUNCIL

Town & Country Planning Act 1990 (as amended)
Town & Country Planning (Development Management Procedure) (England) Order 2015
Planning Permission for Works or Extension to a Dwelling

Application No:	**BN/132/24/HH**
Registered:	14th October 2024
Site Address:	29 Cherry Tree Drive Eastergate PO20 3RR
Grid Reference:	494612 105595
Description of Works:	Construction of a single-storey side extension to the existing eastern elevation

The Council have received the above application.

Click here to view the application details

Should you have any comments to make, these should be sent by replying to this email by 14th November 2024 . You can also monitor the progress of this application through the Council web site:

https://www.arun.gov.uk/planning-application-search

The application will be determined having regard to the development plan policies (if any are relevant) and other material considerations. The development plan can be accessed via the website https://www.arun.gov.uk/development-plan as can information on what comments we can consider https://www.arun.gov.uk/planning-application-comments

Please be aware that any comments you may make will be available on our website so please do not insert personal details or signatures on your reply.

Should the application go to appeal the Planning Inspectorate will publish any comments made to the Council on their website:https://acp.planninginspectorate.gov.uk/ but they will protect personal details.

When the appeal relates to a householder application there will be no opportunity to make further comments.

In the absence of a reply within the period stated, I shall assume that you have no observations to make.

Yours sincerely

Hebe Smith

Planning Officer- Arun District Council

Telephone: 01903 737626

Email: hebe.smith@arun.gov.uk

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