

Stuart Pearce

Subject: FW: WBLR phase 3 – A2300 drainage approach

From: Louise Yandell <Louise.Yandell@midsussex.gov.uk>

Sent: 23 April 2024 15:54

[REDACTED]

Subject: RE: WBLR phase 3 – A2300 drainage approach

Hi Stuart,

Apologies for the delay in coming back to you. As Natalie is satisfied that the amount of water run-off is negligible, I am satisfied that this is an acceptable approach.

Many thanks,

Louise Yandell
01444 477219

Brookleigh Development Manager
Development Management
Mid Sussex District Council

Please note that I work part time Monday – Thursday and am not usually available on Fridays.



[REDACTED]

Sent: Tuesday, April 23, 2024 3:48 PM

To: Louise Yandell <Louise.Yandell@midsussex.gov.uk>

[REDACTED]

Subject: WBLR phase 3 – A2300 drainage approach

Hi Louise,

Please let us know as soon as you can if the below drainage approach is accepted. I am concerned that if it is not – we will then need to develop alternative proposals which could be a problem and take some time to agree.

Many thanks,
Stuart

Sent: Wednesday, April 17, 2024 11:49 AM

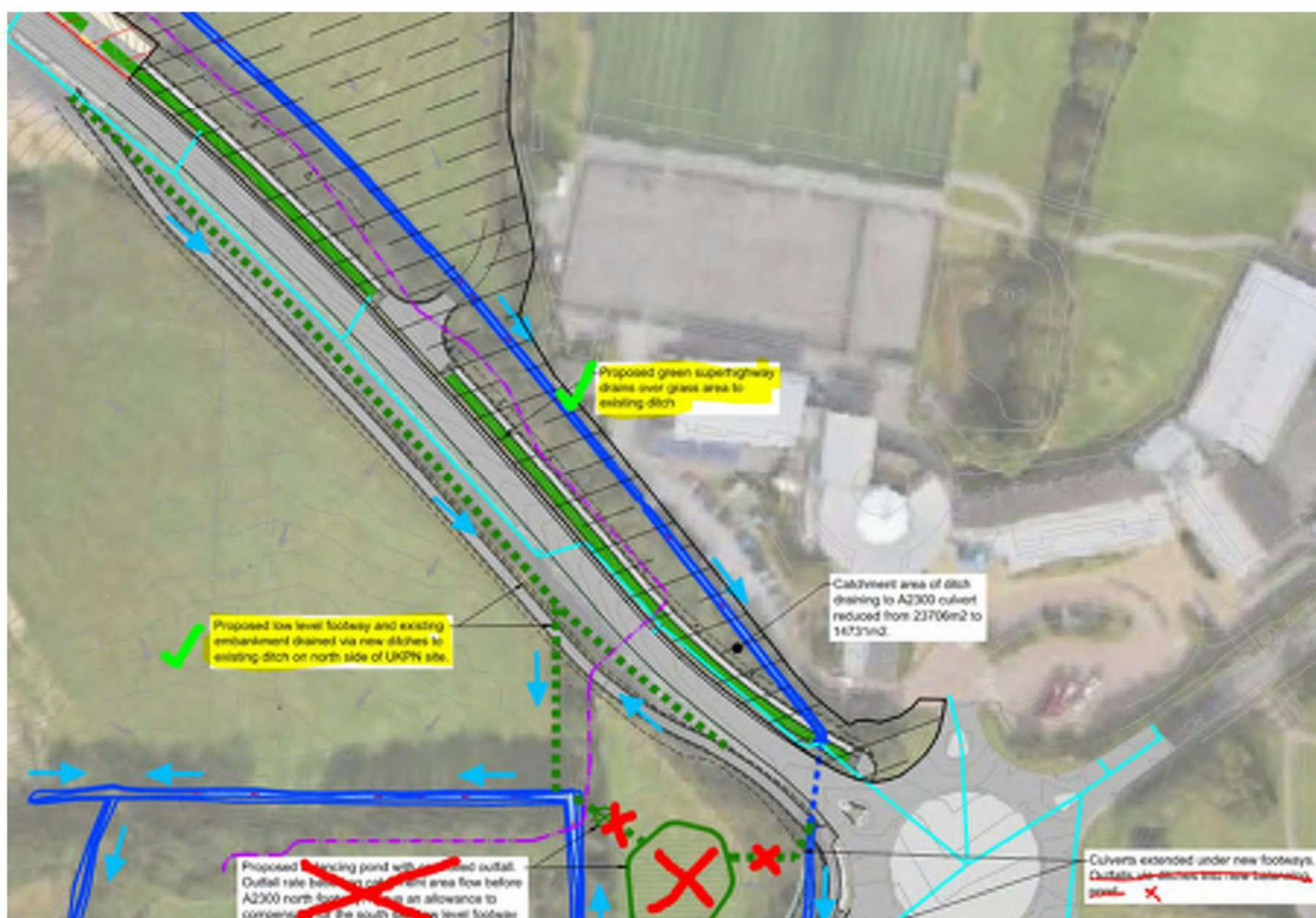
To: Louise Yandell <louise.yandell@midsussex.gov.uk>

Subject: RE: WBLR phase 3 – A2300 footway discharge rates

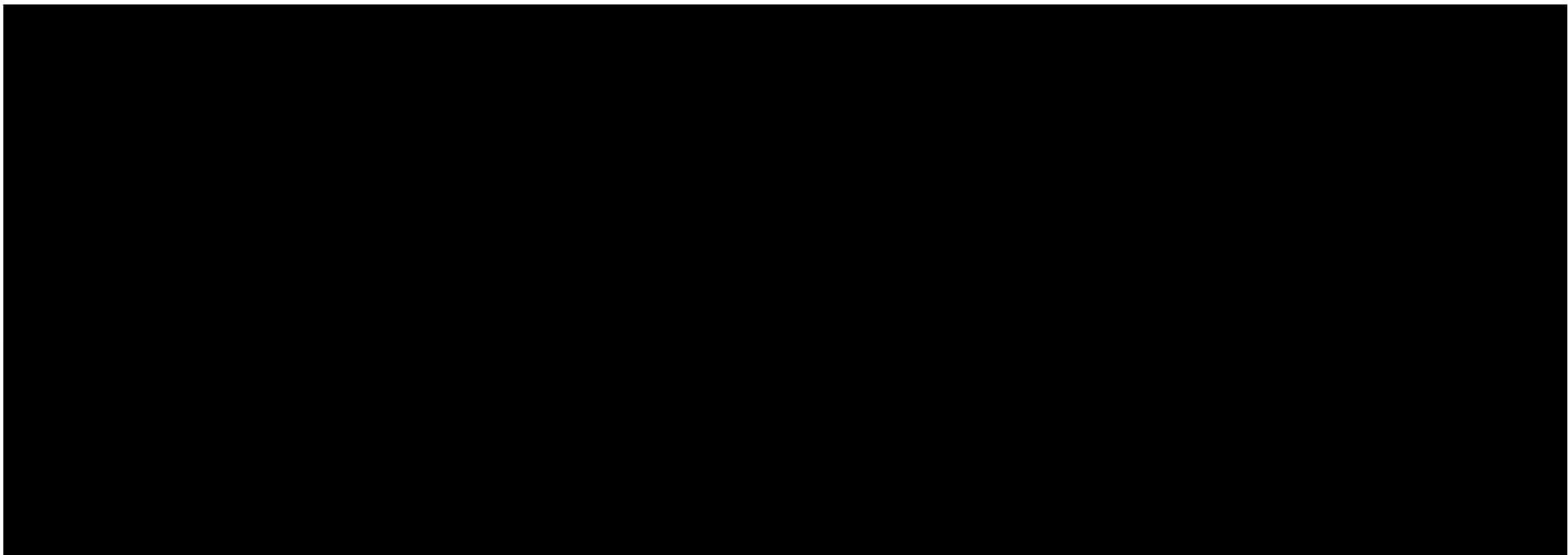
Hello Louise,

Further to Natalie's informal response in email below, please can you confirm if we can now proceed with the following approach for the drainage:

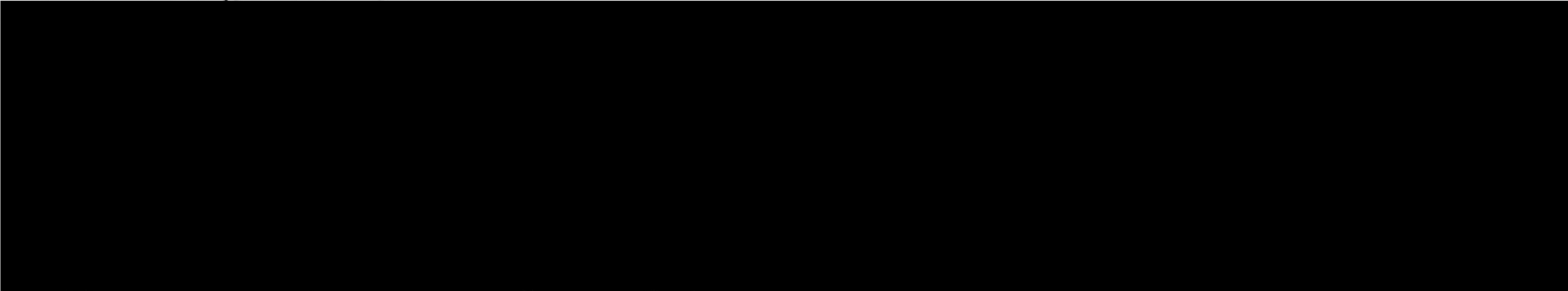
- A2300 north side: run-off from the new paved foot/cycleway not being collected / concentrated in any new system – but instead being allowed to drain off along its length through the adjacent grass/vegetation and eventually any remaining run-off will drain to the existing parallel ditch.
- A2300 South side: run-off from the new paved foot/cycleway and existing A2300 embankment side will flow into a new ditch running parallel and in between the foot/cycleway and A2300, and then turn and outfall into the existing ditch (which becomes The Tributary of the Pook Bourne) to the north of the UKPN plot. Note – this will require a shallow short culvert beneath the new foot/cycleway (details to be agreed).



Kind regards,



From: Natalie James <natalie.james@midsussex.gov.uk>
Sent: Thursday, March 21, 2024 10:14 AM



Subject: RE: WBLR phase 3 – A2300 footway discharge rates

Good morning Stuart,

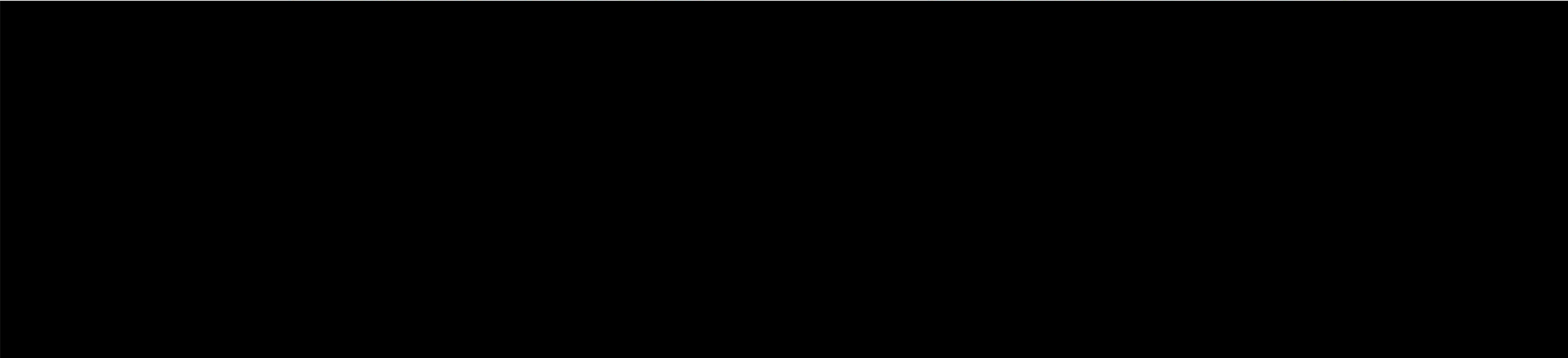
Thank you for sending the footway discharge rates across for review. Following discussions, Andrew Howick and I are content that these proposed improvements can be managed without the provision of any additional surface water attenuation. This is based on the currently proposed approach to the drainage, any significant alterations to that approach will require further discussion.

Louise is away on leave until the 2nd April so please take this as an informal response, I image a more formal response will be provided on her return.

Kind regards,
Natalie

Natalie James
Drainage Engineer (Flood Risk)
Estate Services & Building Control
DD: 01444 477201

From: Stuart Pearce <stuart.pearce@watermangroup.com>
Sent: Thursday, March 7, 2024 12:21 PM
To: Natalie James <natalie.james@midsussex.gov.uk>; Louise Yandell <louise.yandell@midsussex.gov.uk>



Good afternoon Natalie,

Thank you for the quick response. Please see updated table below and revised calcs attached with Cv=1:

	Area m2	Qbar Greenfield Rate l/s	1 in 2 Impermeable Rate l/s	1 in 100 Greenfield Rate** l/s	1 in 100 Impermeable Rate l/s
A2300 - Verge to F'way - North Side	1340	0.8	6.0	2.5	19.6
A2300 - Vegre to F'way - South Side	852	0.5	3.8	1.6	12.5
A2300 - C'way to Verge*	340	0.2	1.5	0.6	5.0
Totals (l/s):		Existing =	2.8	Existing =	9.0
		Proposed =	9.9	Proposed =	32.7

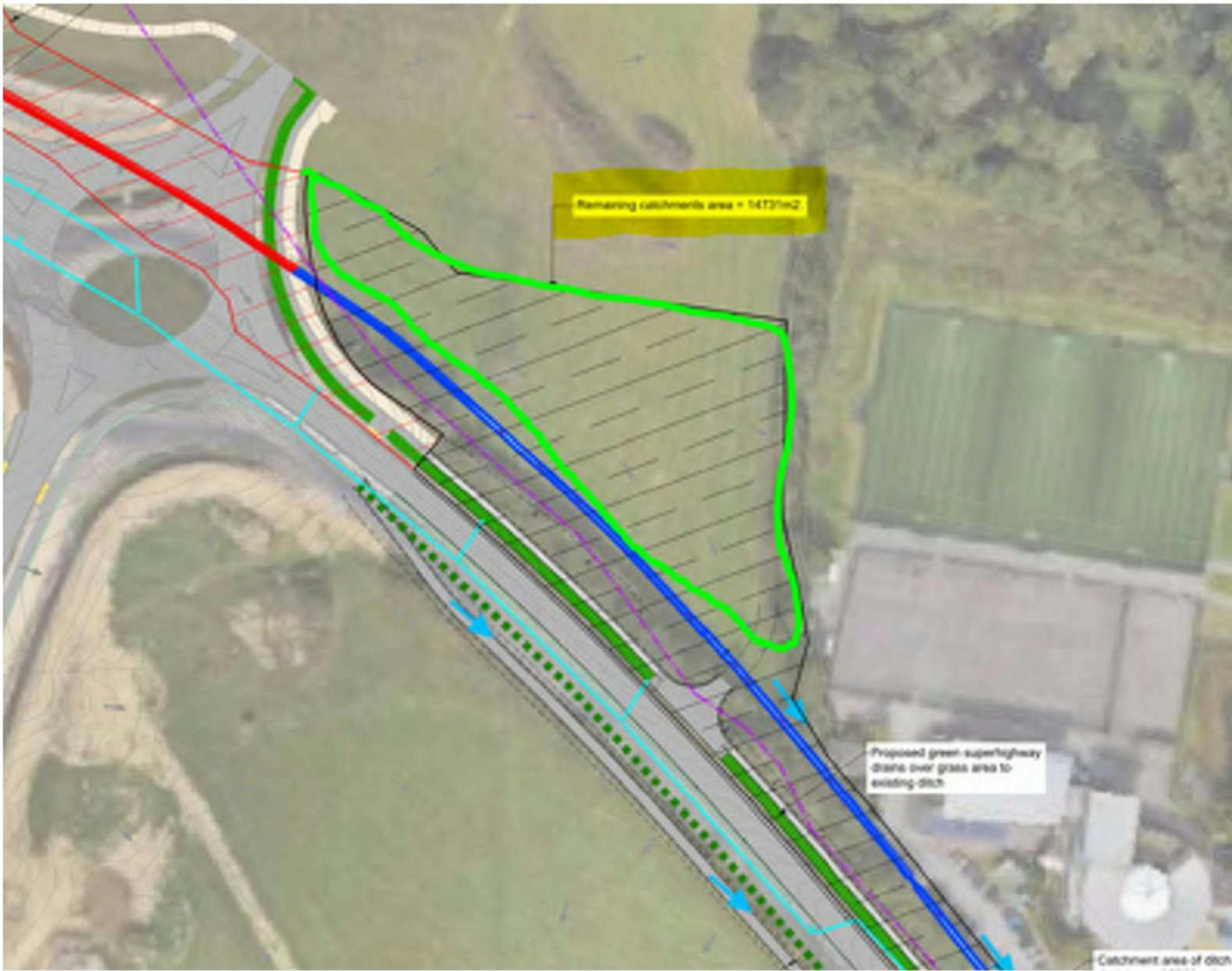
Below is the original Cv=0.79 table (copied from email below) for side by side comparison. As Cv is a straight multiplier in the calculation, the impermeable rates in the table above for Cv=1 are now 1.266 times (1.00/0.79) bigger than for Cv=0.79:

	Area m2	Qbar Greenfield Rate l/s	1 in 2 Impermeable Rate l/s	1 in 100 Greenfield Rate** l/s	1 in 100 Impermeable Rate l/s
A2300 - Verge to F'way - North Side	1340	0.8	4.7	2.5	15.5
A2300 - Vegre to F'way - South Side	852	0.5	3.0	1.6	9.9
A2300 - C'way to Verge*	340	0.2	1.2	0.6	3.9
Totals (l/s):		Existing =	2.5	Existing =	7.9
		Proposed =	7.9	Proposed =	26.0

As you say in your email, a Cv of 1 is a worst case as it assumes zero loss of water - like rain being collected on a plastic sheet. In reality we feel there will be water loss which possibly justifies a Cv less than 1 - particularly when considering the downstream routing of the run-off across grassland/through vegetation/along a new length of ditch before it gets into the existing watercourse. Even the asphalt footway itself with result in some loss/storage – as water fills the texture of the surface and some finds its way through voids and cracks.

Please let me know if you need any further details / alterations on these calculations.

Also – another point regarding the flows into the existing ditch system that *might* have some bearing: The existing catchment includes an area of the adjacent field / development plot – approx. extent encircled in green below. When the plot is developed - a large portion of this area will then be drained to the north towards the River Adur and discharged at a controlled rate based on Qbar? We believe the plot development will not be allowed to discharge into the ditch at all - as it is a highway ditch in highway land? When this occurs – the flows in the ditch and then through the A2300 culvert will be further reduced such that they are then significantly lower than the greenfield / pre-development flows:



Kind regards,
Stuart

From: Natalie James <natalie.james@midsussex.gov.uk>

Sent: Thursday, March 7, 2024 9:30 AM

Louise Yandell <louise.yandell@midsussex.gov.uk>

Subject: RE: WBLR phase 3 – A2300 footway discharge rates

Good morning Stuart,

Thank you for sending these figures over. I note that the Cv used is 0.79, so we can establish the worst case scenario (where no loss of water occurs) please could these number be rerun using a Cv of 1?

Kind regards,
Natalie

Natalie James
Drainage Engineer (Flood Risk)
Estate Services & Building Control
DD: 01444 477201

Sent: Wednesday, March 6, 2024 5:47 PM
To: Natalie James <natalie.james@midsussex.gov.uk>; Louise Yandell <Louise.Yandell@midsussex.gov.uk>

Subject: WBLR phase 3 – A2300 footway discharge rates

Hi Natalie & Louise

Re: WBLR phase 3 – A2300 footway discharge rates

Further to our meeting on Tuesday, we have undertaken an assessment of the surface water flow rates of the new impermeable footway areas proposed on the north and south side of the A2300, vs the greenfield rates.

For each of the two areas, rates are provided for:

- Qbar (approx. 1 in 2.3 yr event) greenfield rate (5.8l/s/ha) vs 1 in 2 yr (nearest figures available in FEH) impervious rate
- 1 in 100 greenfield rate (18.4l/s/ha as used for the adjacent WBLR Phase 1) vs 1 in 100 impervious rate .

The impervious rates are calculated using the Wallingford Modified Rational Method, copy of calcs attached showing variables used.

We have also factored in the proposed narrowing of the A2300 carriageway (the existing hard strips and the existing concrete drainage apron will change from impervious to permeable verge).

Summary of results are shown in table below, showing an overall (north + south sides) increase from

- 2.5 to 7.9 l/s for the Qbar vs 1in2 yr comparison
- 7.9 to 26 l/s for the 1 in 100 yr comparison

	Area m2	Qbar Greenfield Rate l/s	1 in 2 Impermeable Rate l/s	1 in 100 Greenfield Rate** l/s	1 in 100 Impermeable Rate l/s
A2300 - Verge to F'way - North Side	1340	0.8	4.7	2.5	15.5
A2300 - Vegre to F'way - South Side	852	0.5	3.0	1.6	9.9
A2300 - C'way to Verge*	340	0.2	1.2	0.6	3.9
Totals (l/s):		Existing =	2.5	Existing =	7.9
		Proposed =	7.9	Proposed =	26.0

* Narrowing of carriage and removal of concrete drainage apron
** Based on 1:100 greenfield rate of 18.4l/s/ha used in WBLR phase 1

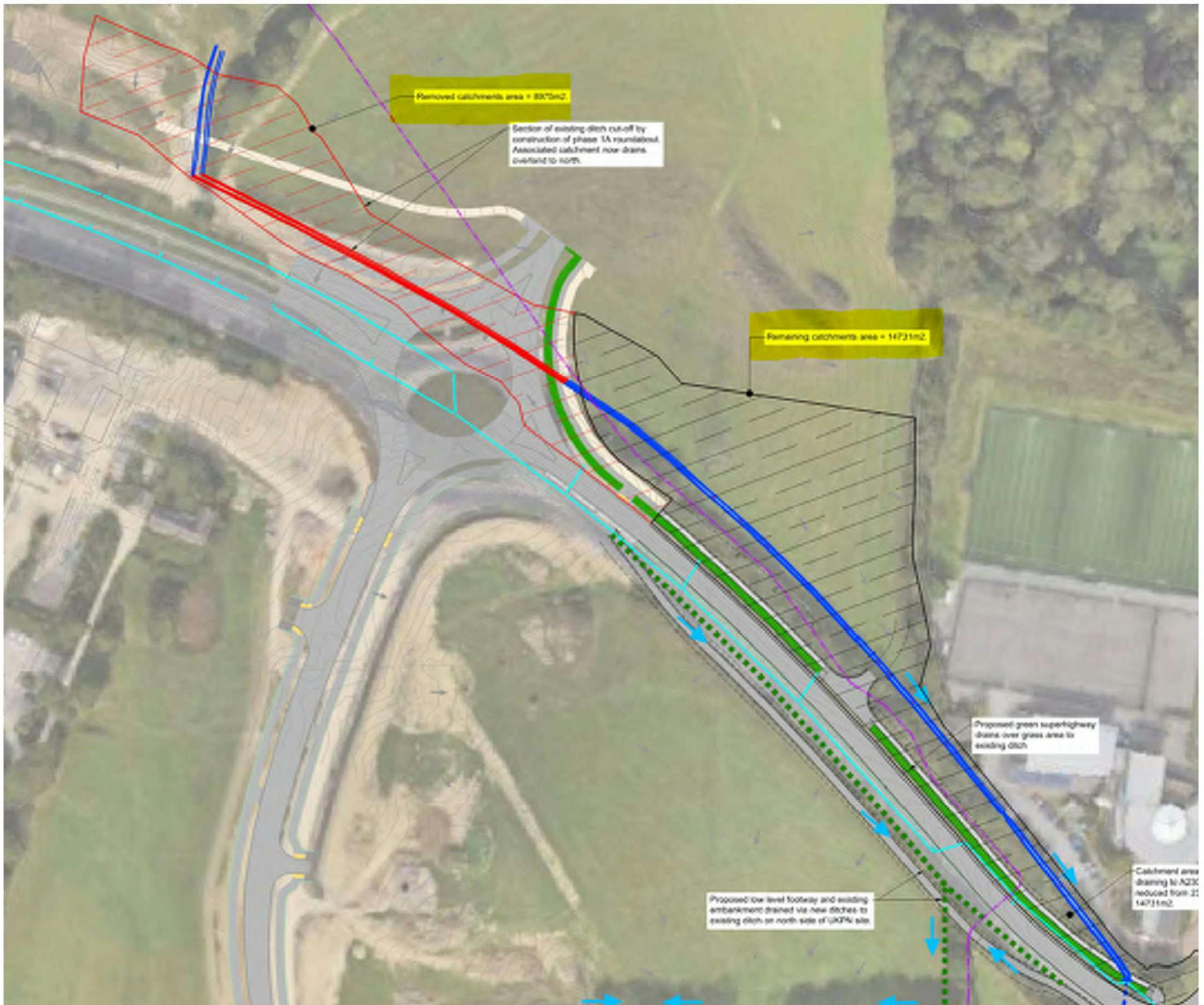
If you would like further details / alternative calculations please let us know.

Other points to note/consider:

- If uncontrolled discharge were proposed – the proposals would still include factors that would slow and naturally attenuate flows on their way to the existing ditches:
On the north side – this would be the flow path of the run-off over a wide area of existing grass / vegetation which would result in areas of ponding and a degree of infiltration.

On the south side – the currently propose new ditch would naturally develop into areas of pooling along it's length, and the adjacent trees will aid infiltration/take-up of water. It may also be possible to form some semi-permeable weirs along the proposed ditch to increase storage potential within it.

- The catchment area of the ditch on the north side of the A2300 has already been significantly reduced (from approx. 2.37ha down to 1.47ha) following the construction of the phase 1A roundabout, with an area now draining northward overland to the River Adur and an area now draining via the phase 1 highway drainage network to the phase 1 attenuation basins. This catchment reduction (approx. 0.9ha) equates to a reduced flow along the remaining ditch and through the culvert under the A2300, based on Q_{bar} , of $0.9ha \times 5.8l/s/ha = 5.22l/s$. This reduction is greater than the north side rate increase due to the proposed phase 3 footway in table above ($0.8l/s$ increasing to $4.7l/s = 3.9l/s$ increase), therefore overall - there is a reduction in flows at the A2300 culvert of approx. $3.9l/s - 5.22l/s = -1.32l/s$.



For reference - below is the full set of greenfield rates calculated by Cambell Reith and submitted /used for phase 1:

Greenfield runoff rates

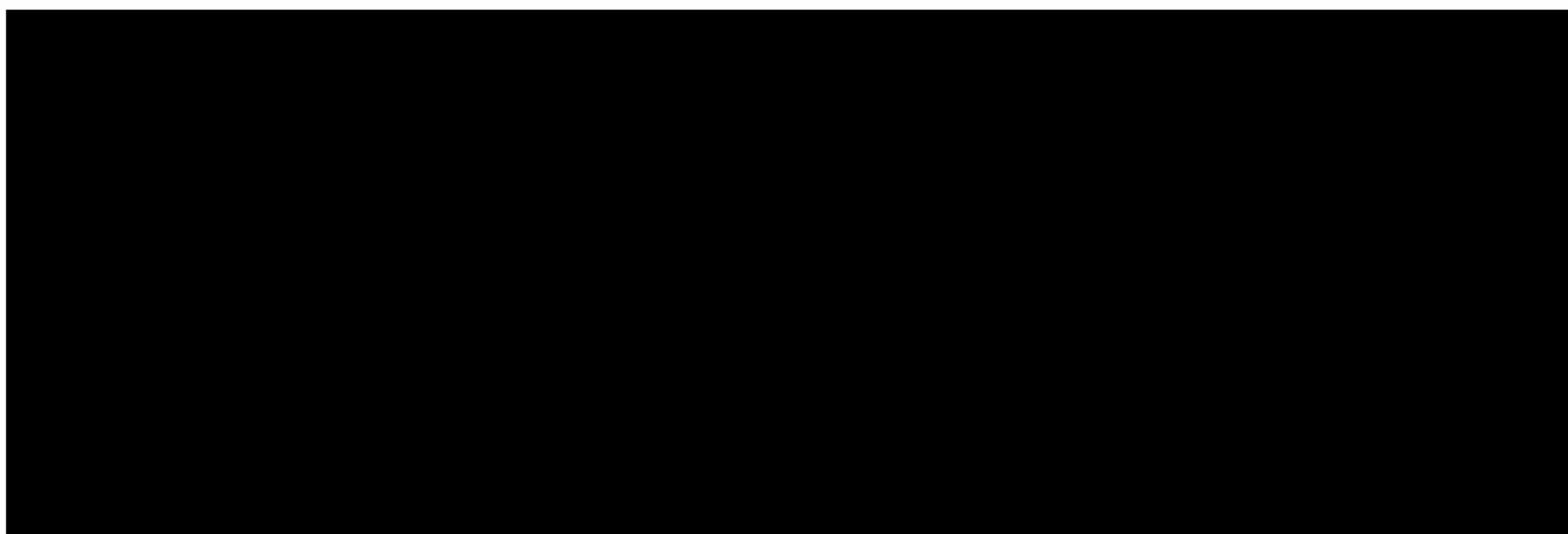
	Default	Edited
Q_{BAR} (l/s):	5.77	5.77
1 in 1 year (l/s):	4.9	4.9
1 in 30 years (l/s):	13.27	13.27
1 in 100 year (l/s):	18.4	18.4
1 in 200 years (l/s):	21.57	21.57

This report was produced using the greenfield runoff tool developed by HR Wallingford and available

Please can you let us know your / MSDC's views regarding the need to try and incorporate attenuation into these small areas, or whether there is possibly betterment being achieved elsewhere in the development which allows this area to discharge to the existing ditches without formal attenuation / discharge control devices being incorporated.

Any queries please let me know.

Kind regards
Stuart



Stuart Pearce

Subject: FW: WBLR phase 3 – A2300 footway discharge rates

From: Natalie James <natalie.james@midsussex.gov.uk>

Sent: 21 March 2024 12:20

[REDACTED]

Subject: RE: WBLR phase 3 – A2300 footway discharge rates

Good afternoon Stuart,

I can confirm our response is based on the below outlined approach to the surface water drainage.

Kind regards,
Natalie

Natalie James
Drainage Engineer (Flood Risk)
Estate Services & Building Control
DD: 01444 477201

From: Stuart Pearce <stuart.pearce@watermangroup.com>

Sent: Thursday, March 21, 2024 10:38 AM

[REDACTED]

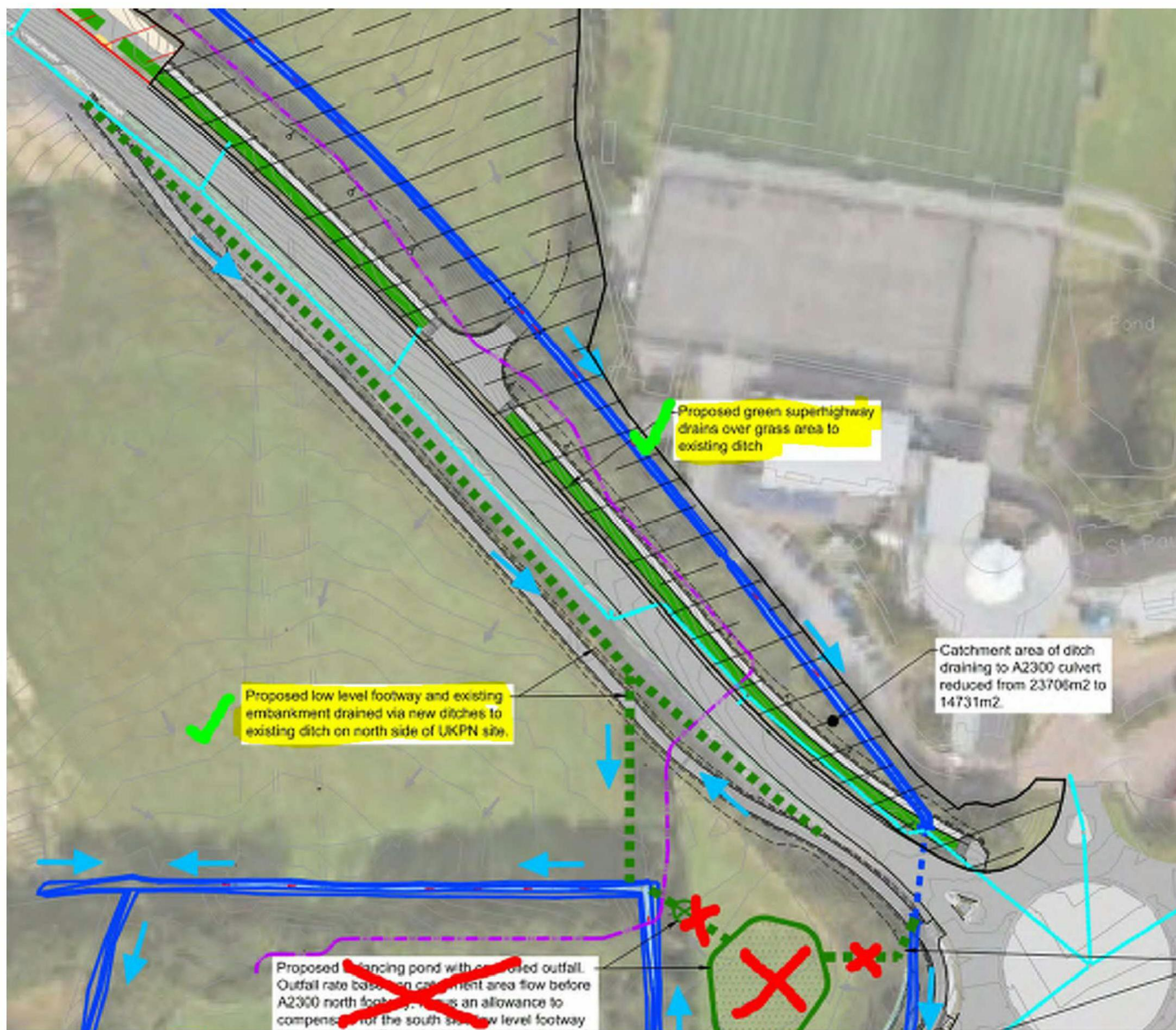
Subject: RE: WBLR phase 3 – A2300 footway discharge rates

Good morning Natalie,

Many thanks for the informal response and we will await Louise's confirmation (hopefully).

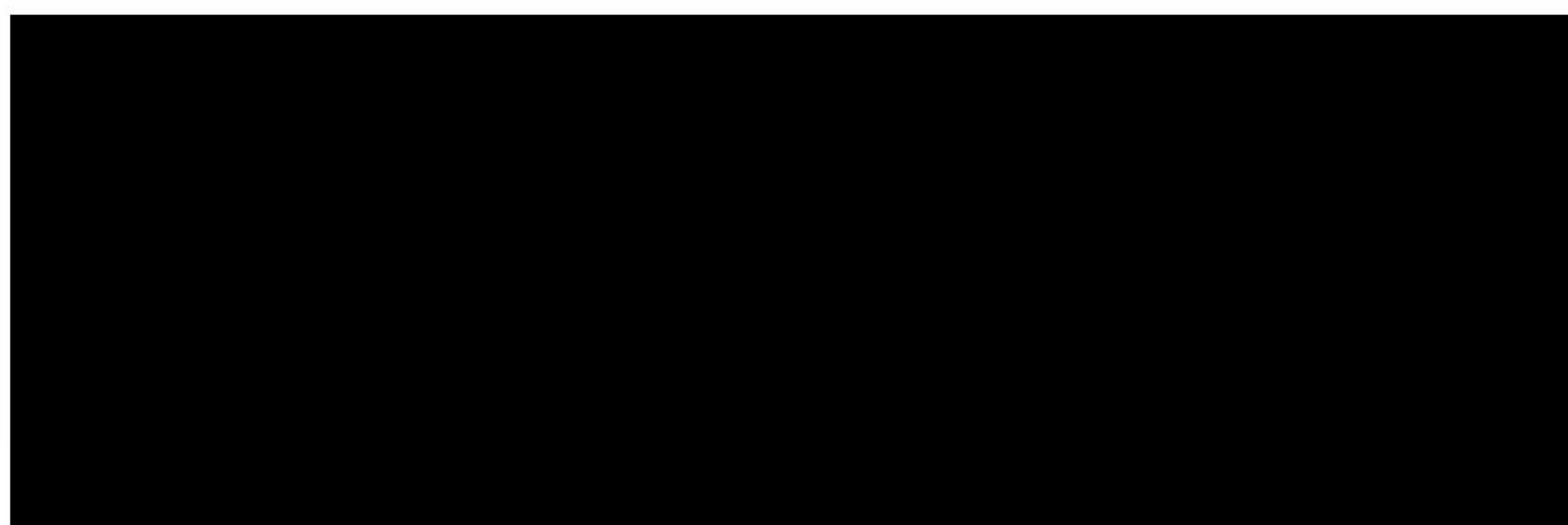
To clarify – when you say 'based on the currently proposed approach to the drainage', I believe this refers to:

- A2300 north side: run-off from the new paved foot/cycleway not being collected / concentrated in any new system – but instead being allowed to drain off along its length through the adjacent grass/vegetation and eventually any remaining run-off will drain to the existing parallel ditch.
- A2300 South side: run-off from the new paved foot/cycleway and existing A2300 embankment side will flow into a new ditch running parallel and in between the foot/cycleway and A2300, and then turn and outfall into the existing ditch (which becomes The Tributary of the Pook Bourne) to the north of the UKPN plot. Note – this will require a shallow short culvert beneath the new foot/cycleway (details to be agreed).



Is this what you refer to please?

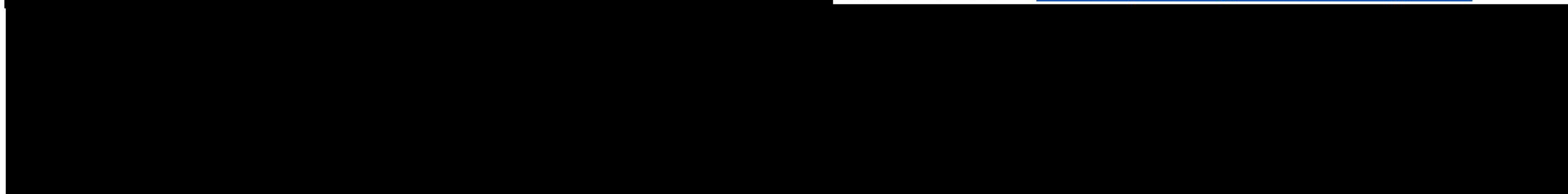
Kind regards
Stuart



From: Natalie James <natalie.james@midsussex.gov.uk>

Sent: Thursday, March 21, 2024 10:14 AM

Louise Yandell <louise.yandell@midsussex.gov.uk>



Subject: RE: WBLR phase 3 – A2300 footway discharge rates

Good morning Stuart,

Thank you for sending the footway discharge rates across for review. Following discussions, Andrew Howick and I are content that these proposed improvements can be managed without the provision of any additional surface water attenuation. This is based on the currently proposed approach to the drainage, any significant alterations to that approach will require further discussion.

Louise is away on leave until the 2nd April so please take this as an informal response, I imagine a more formal response will be provided on her return.

Kind regards,
Natalie

Natalie James
Drainage Engineer (Flood Risk)
Estate Services & Building Control
DD: 01444 477201

Sent: Thursday, March 7, 2024 12:21 PM

To: Natalie James <natalie.james@midsussex.gov.uk>; Louise Yandell <louise.yandell@midsussex.gov.uk>

Good afternoon Natalie,

Thank you for the quick response. Please see updated table below and revised calcs attached with Cv=1:

	Area m2	Qbar Greenfield Rate l/s	1 in 2 Impermeable Rate l/s	1 in 100 Greenfield Rate** l/s	1 in 100 Impermeable Rate l/s
A2300 - Verge to F'way - North Side	1340	0.8	6.0	2.5	19.6
A2300 - Vegre to F'way - South Side	852	0.5	3.8	1.6	12.5
A2300 - C'way to Verge*	340	0.2	1.5	0.6	5.0
Totals (l/s):		Existing =	2.8	Existing =	9.0
		Proposed =	9.9	Proposed =	32.7

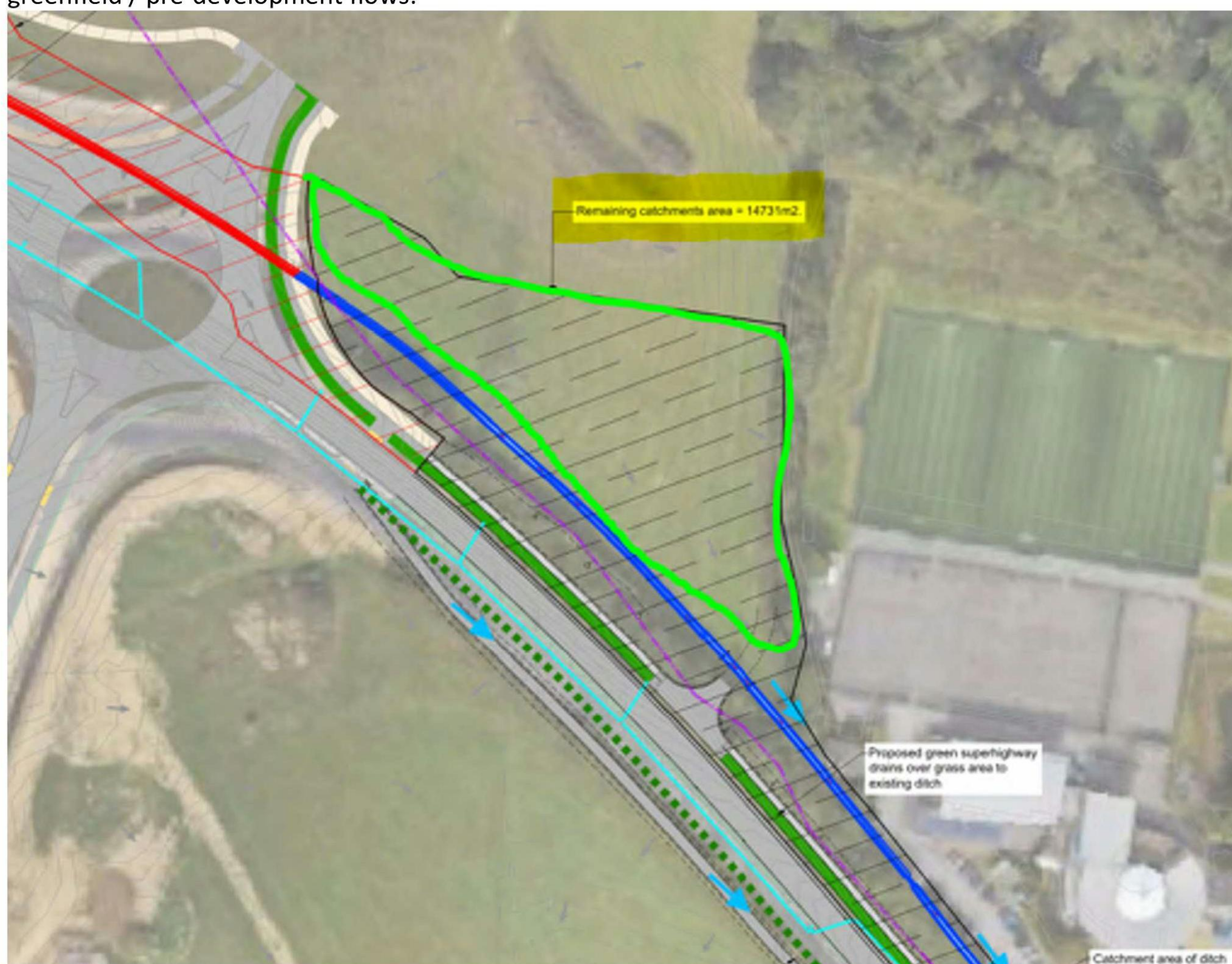
Below is the original Cv=0.79 table (copied from email below) for side by side comparison. As Cv is a straight multiplier in the calculation, the impermeable rates in the table above for Cv=1 are now 1.266 times (1.00/0.79) bigger than for Cv=0.79:

	Area m2	Qbar Greenfield Rate l/s	1 in 2 Impermeable Rate l/s	1 in 100 Greenfield Rate** l/s	1 in 100 Impermeable Rate l/s
A2300 - Verge to F'way - North Side	1340	0.8	4.7	2.5	15.5
A2300 - Vegre to F'way - South Side	852	0.5	3.0	1.6	9.9
A2300 - C'way to Verge*	340	0.2	1.2	0.6	3.9
Totals (l/s):		Existing =	2.5	Existing =	7.9
		Proposed =	7.9	Proposed =	26.0

As you say in your email, a Cv of 1 is a worst case as it assumes zero loss of water - like rain being collected on a plastic sheet. In reality we feel there will be water loss which possibly justifies a Cv less than 1 - particularly when considering the downstream routing of the run-off across grassland/through vegetation/along a new length of ditch before it gets into the existing watercourse. Even the asphalt footway itself will result in some loss/storage – as water fills the texture of the surface and some finds its way through voids and cracks.

Please let me know if you need any further details / alterations on these calculations.

Also – another point regarding the flows into the existing ditch system that *might* have some bearing: The existing catchment includes an area of the adjacent field / development plot – approx. extent encircled in green below. When the plot is developed - a large portion of this area will then be drained to the north towards the River Adur and discharged at a controlled rate based on Qbar? We believe the plot development will not be allowed to discharge into the ditch at all - as it is a highway ditch in highway land? When this occurs – the flows in the ditch and then through the A2300 culvert will be further reduced such that they are then significantly lower than the greenfield / pre-development flows:



Kind regards,

Stuart

From: Natalie James <natalie.james@midsussex.gov.uk>

Sent: Thursday, March 7, 2024 9:30 AM

[REDACTED]

Subject: RE: WBLR phase 3 – A2300 footway discharge rates

Good morning Stuart,

Thank you for sending these figures over. I note that the Cv used is 0.79, so we can establish the worst case scenario (where no loss of water occurs) please could these number be rerun using a Cv of 1?

Kind regards,
Natalie

Natalie James
Drainage Engineer (Flood Risk)
Estate Services & Building Control
DD: 01444 477201

Sent: Wednesday, March 6, 2024 5:47 PM

To: Natalie James <natalie.james@midsussex.gov.uk>; Louise Yandell <Louise.Yandell@midsussex.gov.uk>

[REDACTED]

Hi Natalie & Louise

Re: WBLR phase 3 – A2300 footway discharge rates

Further to our meeting on Tuesday, we have undertaken an assessment of the surface water flow rates of the new impermeable footway areas proposed on the north and south side of the A2300, vs the greenfield rates.

For each of the two areas, rates are provided for:

- Qbar (approx. 1 in 2.3 yr event) greenfield rate (5.8l/s/ha) **vs** 1 in 2 yr (nearest figures available in FEH) impervious rate
- 1 in 100 greenfield rate (18.4l/s/ha as used for the adjacent WBLR Phase 1) **vs** 1 in 100 impervious rate .

The impervious rates are calculated using the Wallingford Modified Rational Method, copy of calcs attached showing variables used.

We have also factored in the proposed narrowing of the A2300 carriageway (the existing hard strips and the existing concrete drainage apron will change from impervious to permeable verge).

Summary of results are shown in table below, showing an overall (north + south sides) increase from

- 2.5 to 7.9 l/s for the Qbar vs 1in2 yr comparison
- 7.9 to 26 l/s for the 1 in 100 yr comparison

	Area m2	Qbar Greenfield Rate l/s	1 in 2 Impermeable Rate l/s	1 in 100 Greenfield Rate** l/s	1 in 100 Impermeable Rate l/s
A2300 - Verge to F'way - North Side	1340	0.8	4.7	2.5	15.5
A2300 - Vegre to F'way - South Side	852	0.5	3.0	1.6	9.9
A2300 - C'way to Verge*	340	0.2	1.2	0.6	3.9
Totals (l/s):		Existing =	2.5	Existing =	7.9
		Proposed =	7.9	Proposed =	26.0

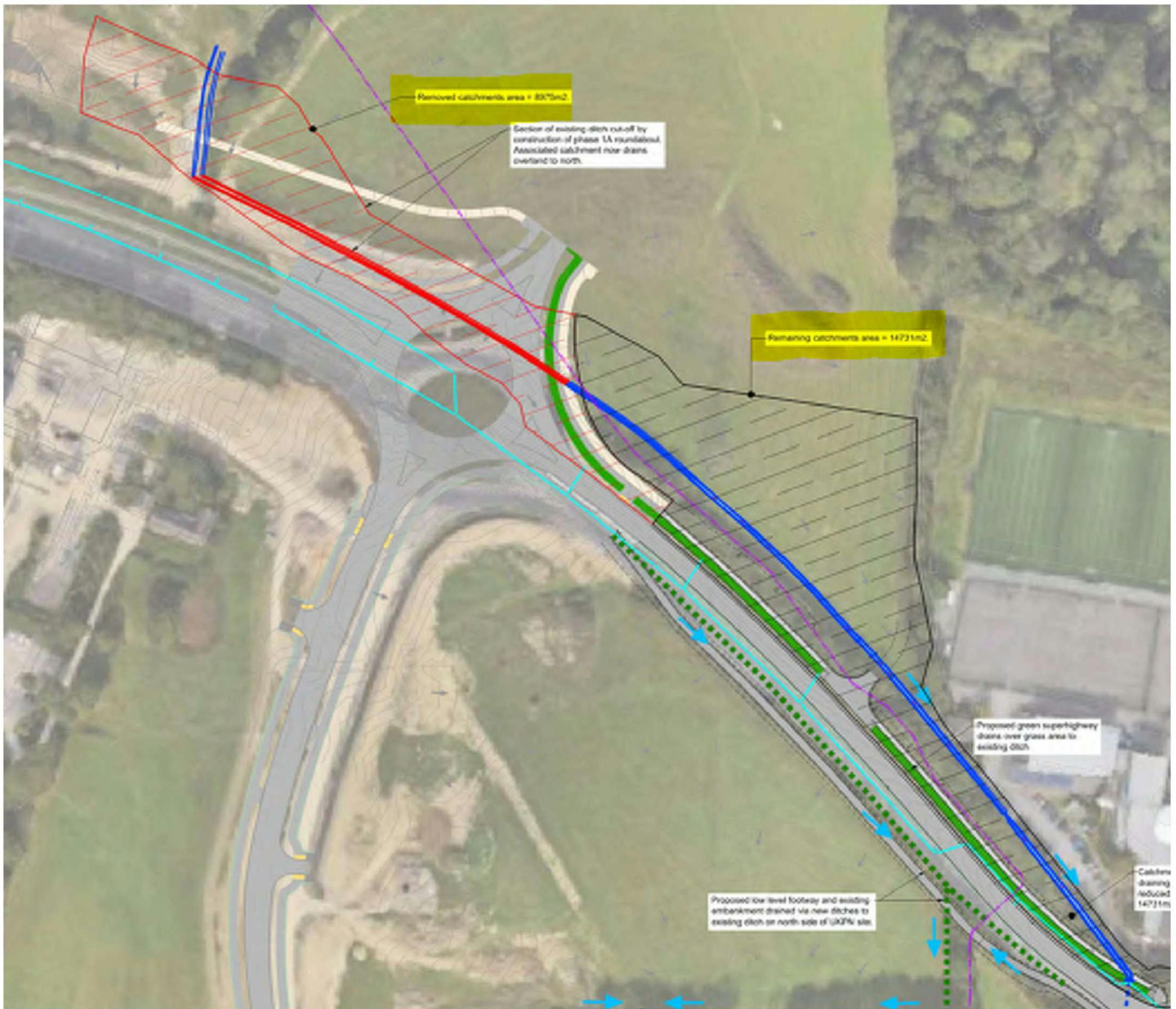
* Narrowing of carriage and removal of concrete drainage apron

** Based on 1:100 greenfield rate of 18.4l/s/ha used in WBLR phase 1

If you would like further details / alternative calculations please let us know.

Other points to note/consider:

- If uncontrolled discharge were proposed – the proposals would still include factors that would slow and naturally attenuate flows on their way to the existing ditches:
On the north side – this would be the flow path of the run-off over a wide area of existing grass / vegetation which would result in areas of ponding and a degree of infiltration.
On the south side – the currently propose new ditch would naturally develop into areas of pooling along it's length, and the adjacent trees will aid infiltration/take-up of water. It may also be possible to form some semi-permeable weirs along the proposed ditch to increase storage potential within it.
- The catchment area of the ditch on the north side of the A2300 has already been significantly reduced (from approx. 2.37ha down to 1.47ha) following the construction of the phase 1A roundabout, with an area now draining northward overland to the River Adur and an area now draining via the phase 1 highway drainage network to the phase 1 attenuation basins. This catchment reduction (approx. 0.9ha) equates to a reduced flow along the remaining ditch and through the culvert under the A2300, based on Qbar, of 0.9ha x 5.8l/s/ha = 5.22l/s. This reduction is greater than the north side rate increase due to the proposed phase 3 footway in table above (0.8l/s increasing to 4.7l/s = 3.9l/s increase), therefore overall - there is a reduction in flows at the A2300 culvert of approx. 3.9l/s-5.22l/s = -1.32l/s.



For reference - below is the full set of greenfield rates calculated by Cambell Reith and submitted /used for phase 1:

Greenfield runoff rates		
	Default	Edited
Q _{BAR} (l/s):	5.77	5.77
1 in 1 year (l/s):	4.9	4.9
1 in 30 years (l/s):	13.27	13.27
1 in 100 year (l/s):	18.4	18.4
1 in 200 years (l/s):	21.57	21.57

This report was produced using the greenfield runoff tool developed by HR Wallingford and available

Please can you let us know your / MSDC's views regarding the need to try and incorporate attenuation into these small areas, or whether there is possibly betterment being achieved elsewhere in the development which allows this area to discharge to the existing ditches without formal attenuation / discharge control devices being incorporated.

Any queries please let me know.

Kind regards

Stuart

