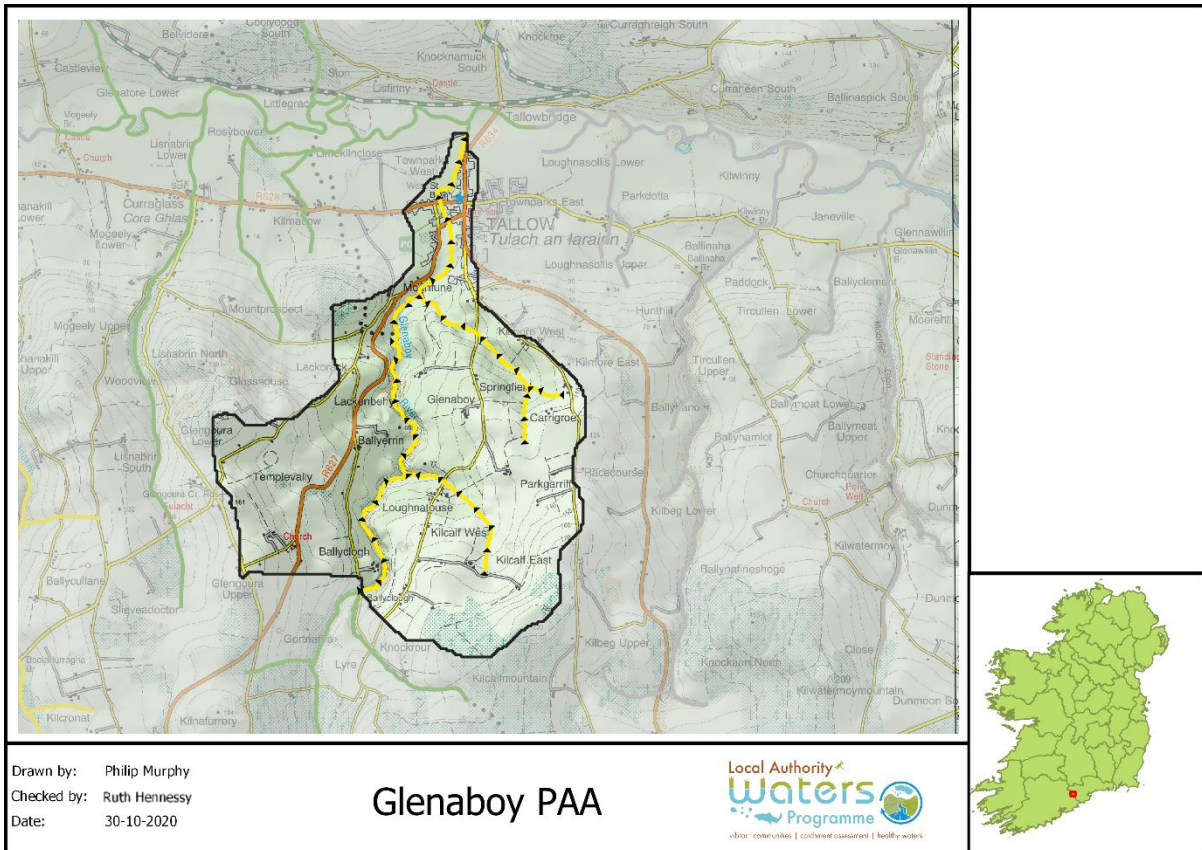


AFA0083

Glenaboy Priority Area for Action

Desk Study



©Ordnance Survey Ireland 2019/OSi_NMA_073

Disclaimer:

Although every effort has been made to ensure the accuracy of the material contained in this publication, complete accuracy cannot be guaranteed. The Local Authority Waters Programme (LAWPRO) nor the author(s) accept any responsibility whatsoever for loss or damage occasioned, or claimed to have been occasioned, in part or in full as a consequence of any person acting or refraining from acting, as a result of a matter contained in this publication. All or part of this publication may be reproduced without further permission, provided the source is acknowledged

Table of Contents

Acknowledgements.....	3
Summary	4
1 Background	5
2 Receptor information.....	9
2.1 Overview table	9
2.2 Hydrochemistry.....	11
2.3 Hydromorphology	12
2.4 Protected areas.....	12
3 Significant pressures	13
3.1 Initial EPA characterisation	13
3.2 Conclusion on the Significant Pressures:	13
4 Pathways Information (diffuse pollution)	16
4.1 Aquifers and bedrock.....	16
4.2 Karst features and/or sand and gravel aquifers	16
4.3 Soils and subsoils	16
4.4 Pathways	16
5 Interim conclusions on the PAA.....	19
6 Workplan.....	20
6.1 EPA further characterisation actions	20
6.2 Local Catchment Assessment.....	20
7 Review of possible mitigation options	21
8 Communications	22
8.1 Community Information Meeting.....	22
9 Appendices.....	23
9.1 Communications with Local Authorities	23
9.2 Communications with Inland Fisheries Ireland.....	24

List of Figures

Figure 1-1: Glenaboy Priority Area for Action Ecological Status (2018)	6
Figure 1-2: Glenaboy Priority Area for Action WFD Risk Map	6
Figure 1-3: Map of monitoring station locations.	8
Figure 2-1 Temporal values for PO ₄ on Glenaboy_020	10
Figure 2-2 Temporally values for NH ₃ on Glenaboy_020	10
Figure 2-3 Temporal values for TON (NO ₃) on Glenaboy_020	11
Figure 2-4: Glenaboy_020 waterbody status details	12
Figure 2-5: Glenaboy_020 Q value chart	12
Figure 3-1: Glenaboy_020 sub-basin land use map	14
Figure 3-2: Glenaboy_020 sub-basin Nitrate PIP map	14
Figure 3-3 Glenaboy_020 sub-basin Phosphate PIP map	15
Figure 4-1: Glenaboy_020 aquifer map	17
Figure 4-2: Glenaboy_020 bedrock map	17
Figure 4-3: Glenaboy_020 soil map	18
Figure 4-4: Glenaboy_020 sub-soil map	18
Figure 9-1: Location of discharge	23
Figure 9-2: Photo discharge 21/04/2017	23

List of Tables

Table 1-1: Background information on the Glenaboy PAA	5
Table 1-2: Waterbody (WB) details for Glenaboy PAA	5
Table 1-3: Reasons Glenaboy PAA was selected	5
Table 1-4: Summary table of individual waterbodies within the Glenaboy PAA	7
Table 1-5: List of monitoring stations for Glenaboy_020.	8
Table 2-1: Receptor information for Glenaboy PAA	9
Table 3-1: Glenaboy_020 Pressures details	13
Table 6-1: Glenaboy PAA further characterisation action details	20

Acknowledgements

The authors would like to acknowledge the contribution of the relevant agencies who have carried out a significant amount of work in the catchment in recent years and their support of the Local Authority Waters Programme (LAWPRO).

Data attribution:

The following data sources were consulted in the preparation of this report:

Catchment boundaries, waterbodies and areas for action: EPA (2018)

Bedrock Unit: GSI (2008)

Aquifer Category: GSI (2015)

Groundwater body: EPA Catchments Unit (2018)

Soils & Subsoils Maps: Teagasc (2015)

IFS Soils: EPA (2006)

Susceptibility and Pollution Impact Potential Maps: EPA (2018)

WFD waterbody status: EPA (2018)

SAC and NHA boundaries: NPWS (2018)

All maps in this document containing OSI maps are under the following copyright: © Ordnance Survey Ireland. All rights reserved. Licence number: 2020/OSi_NMA_073

Summary

Glenaboy PAA is a single waterbody PAA located in County Waterford. It is within the Blackwater (Munster) catchment area. It is the responsibility of the LAWPRO South East team in collaboration with Waterford County Council. The Glenaboy_020 is currently *At Risk*. Glenaboy_010 is *Not At Risk*. Glenaboy_020 is not a High Status objective. The reasons it was selected as a PAA are as follows: Test case for diffuse urban issues, Building on existing work by IFI, Headwater tributary to the main channel of the Bride (Blackwater), One deteriorated water body.

The current ecological status is Moderate – at Br u/s Bride R confl monitoring station. Analysis of hydrochemistry data indicates that consistently elevated levels of NO₃ is the significant issue. Multiple spikes in PO₄ suggest a point or multi point pressure exists in the catchment area as diffuse P is not a risk in this PAA. The significant pressure is Urban run-off (Initial Characterisation) and agriculture (desk study analysis). The most likely pathways with respect to the significant issue are diffuse urban run off on made area (soil sealed) and sub-surface flow on pasture area.

The workplan for the Glenaboy PAA includes following the guidance of the IA6 and IA7 that have been assigned to this waterbody. An urban area local catchment assessment will be carried out to identify sources of urban run-off pressures. Multiple sites will be selected for SSIS assessments and physio-chemical parameter measurements, including at Ballyclogh Br monitoring station to rule out any pressures or impacts incoming from Glenaboy_010. Multiple water chemistry samples will be taken over several weeks to determine whether nutrients are still a significant issue.

1 Background

Table 1-1: Background information on the Glenaboy PAA

Priority Area for Action	Catchment Number	Catchment Name	Sub catchment	Region	Local Authority
Glenaboy	18	Blackwater (Munster)	18_19 Bride[Waterford]_SC_030	SE	Waterford

Table 1-2: Waterbody (WB) details for Glenaboy PAA

Priority Area for Action	No. of At Risk WBs	No. of Review WBs	No. of RBMP Prioritised WBs	No of WBs for Status Improvement:		
				2021	2027	Beyond 2027
Glenaboy	1	0	0	1	0	0

Table 1-3: Reasons Glenaboy PAA was selected

Reason for selection
<ul style="list-style-type: none"> • Test case for diffuse urban issues. • Building on existing work by IFI. • Headwater tributary to the main channel of the Bride (Blackwater). • One deteriorated water body.

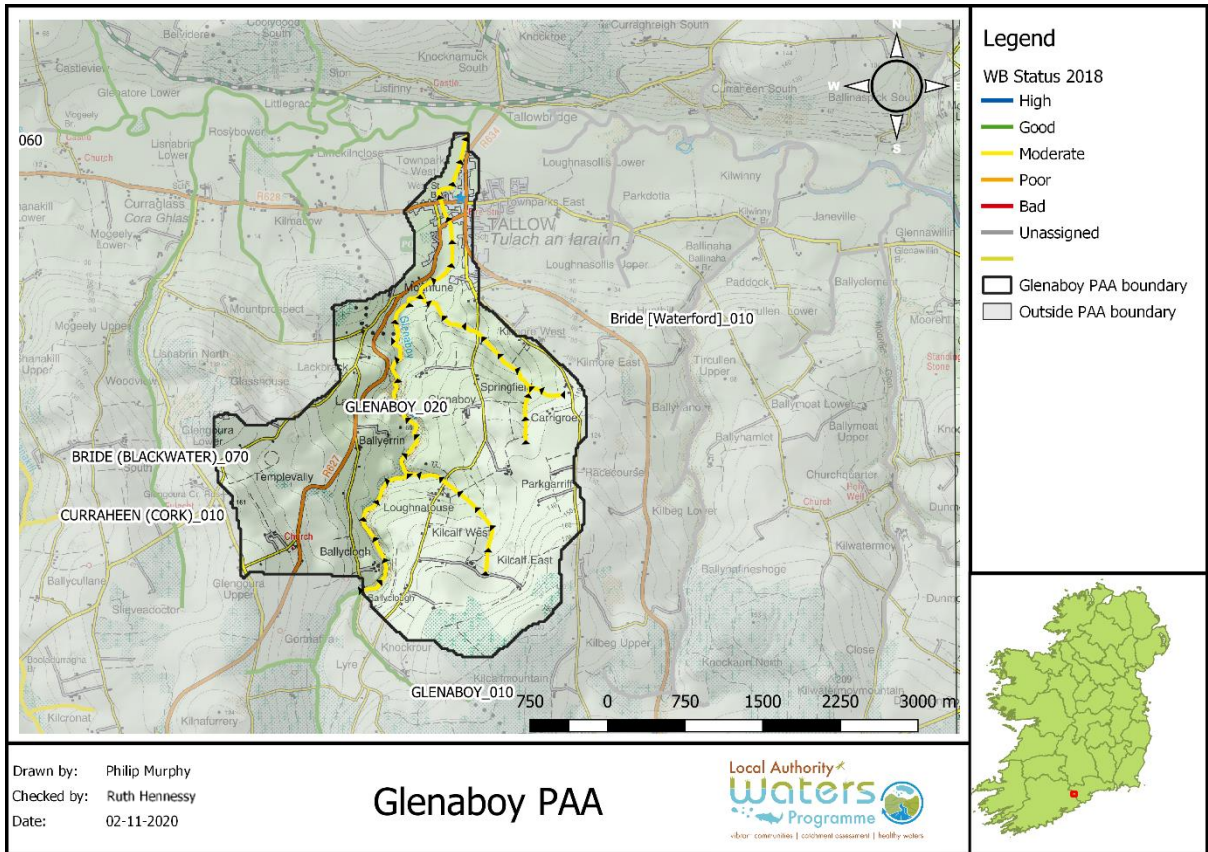


Figure 1-1: Glenaboy Priority Area for Action Ecological Status (2018)

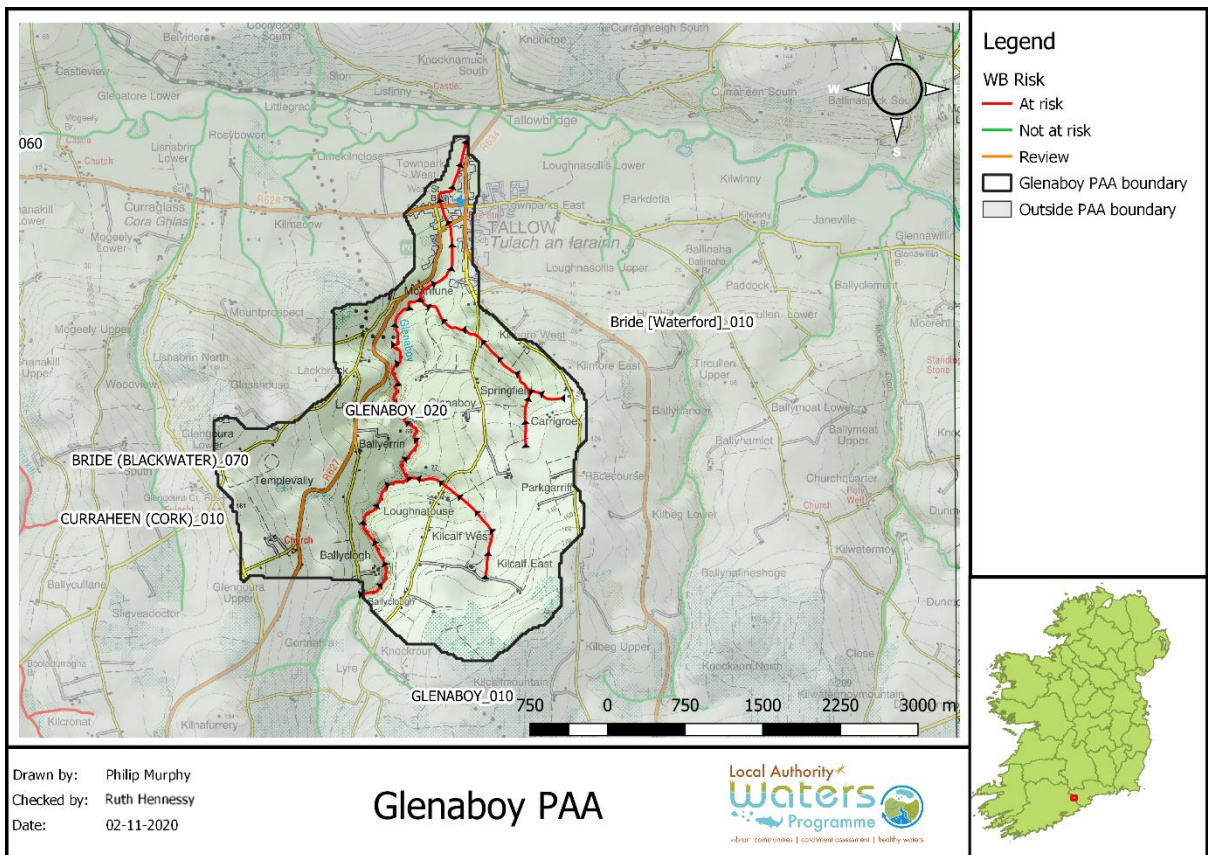


Figure 1-2: Glenaboy Priority Area for Action WFD Risk Map

Table 1-4: Summary table of individual waterbodies within the Glenaboy PAA

Water body Code	Water body Name	Risk <i>Use colour codes</i>	Obj.	Ecological Status				Pressures		
				2009	2012	2015	2018	Category	Subcategory	Sig? (Y/N)
IE_SW_18G050600	GLENABOY_020	<i>At Risk</i>	Good	Moderate	Moderate	Moderate	Moderate	Urban Run-off	Diffuse Sources Run-Off	Yes
IE_SW_18G050200	GLENABOY_010	<i>Not at risk</i>	Good	Good	Good	Good	Good	-	-	-

Source: WFD App

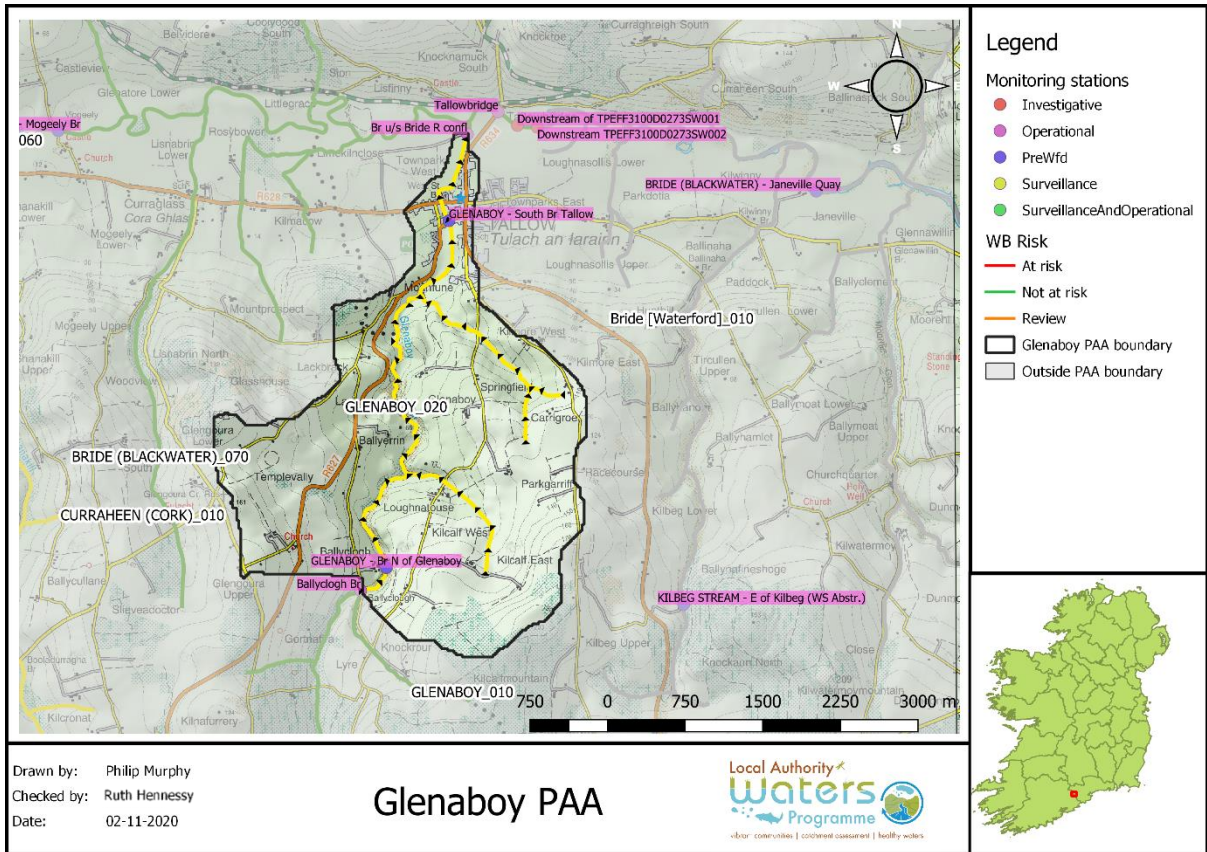


Figure 1-3: Map of monitoring station locations.

Table 1-5: List of monitoring stations for Glenaboy_020.

Water body Name	MP Code	Station	Type	Monitoring Results
GLENABOY_020	RS18G050300	Br N of Glenaboy	PreWfd	No
	RS18G050400	South Br Tallow	PreWfd	No
	RS18G050500	Br u/s Bride R confl	Operational	Yes

Source: WFD App

2 Receptor information

2.1 Overview table

Table 2-1: Receptor information for Glenaboy PAA

Waterbody ID		Glenaboy_020
Risk Category		<i>At Risk</i>
Biological Status	2010-2015	Moderate
	2016-2018	Moderate
	Trends in Q values 2016-2018 Q value data Fish status (where rel)	Consistently Moderate status Nitrate level is driving status N/A
Hydrochemistry Data		
PO ₄ (mg/l P)	Baseline	2017: 0.048
	Indicative quality	Moderate
	Trends – sig.?	Upwards - No
	Dist. to threshold	Far
NH ₄ (mg/l N)	Baseline	2017: 0.101
	Indicative quality	Moderate
	Trends – sig.?	Downwards - No
	Dist. to threshold	Far
NO ₃ (mg/l N)	Baseline	2017: 4.260
	Indicative quality	Moderate
	Trends – sig.?	Upwards - No
	Dist. to threshold	Far
Supporting Conditions	Chemical Conditions	Pass
	Oxygenation Conditions	Pass
	Acidification Conditions	Pass
Hydromorphology		
RHAT score		N/A
Evidence of Arterial drainage		N/A
Ecological Status (2010–2015)		
Protected Areas		Yes
WFD Objective		Good
EPA biologist notes (if any)		<i>Date surveyed, 16/08/18: The ecological condition of the Glenaboy is the same in 2018 as on every sampling occasion since 2000, with Good quality in the upper reaches and moderate quality in the lower.</i>
Significant issue/impact for receptor		NO ₃ – consistently elevated. PO ₄ – significant peaks.

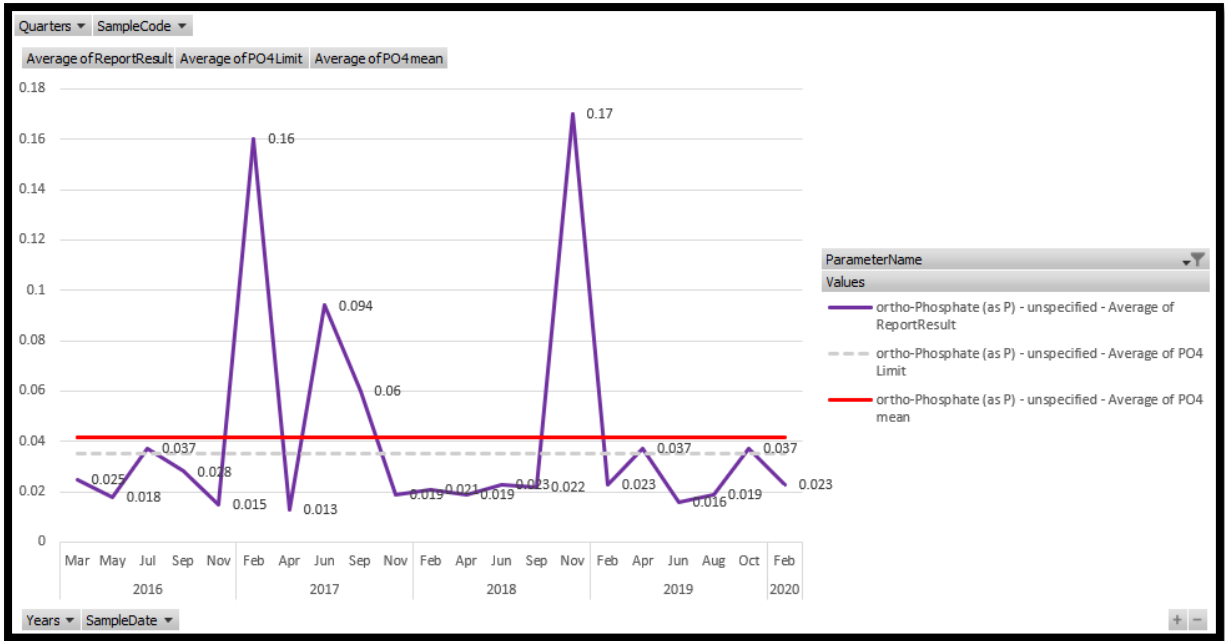


Figure 2-1 Temporal values for PO₄ on Glenaboy_020

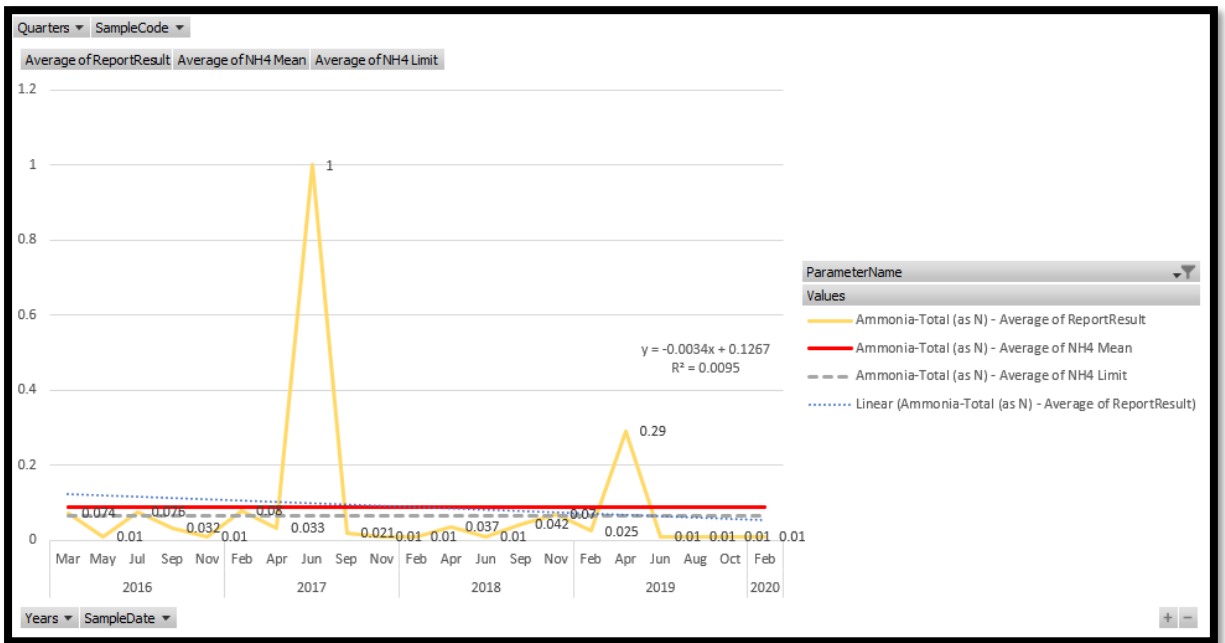


Figure 2-2 Temporally values for NH₃ on Glenaboy_020

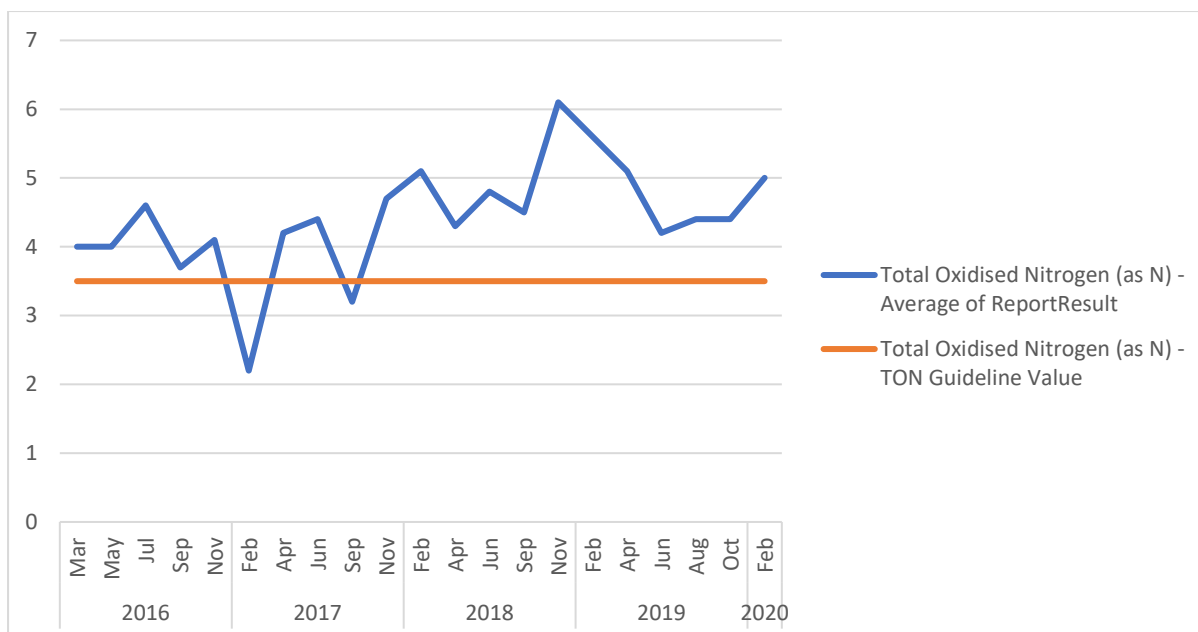


Figure 2-3 Temporal values for TON (NO₃) on Glenaboy_020

2.2 Hydrochemistry

Glenaboy_020 receptor assessment details are shown in Table 2-1, Figure 2-4 and Figure 2-5.

- **Br u/s Bride R confl. monitoring station:**

- 2017 baseline (mg/l):
 - **P04:** 0.048 – 109% of threshold
 - **NH4:** 0.101 – 148% of threshold
 - **NO3:** 4.260 – 119% of threshold
- Annual results (mg/l):
 - **P04 2016 to 2018:** 0.025, 0.069, 0.051 respectively
 - **NH4 2016 to 2018:** 0.040, 0.229, 0.034 respectively
 - **NO3 2016 to 2018:** 4.1, 3.7, 5.0 respectively
- Outlier values (mg/l):
 - **P04:** Substantial outliers in February and June 2017 (0.16 and 0.094) and in November 2018 (0.19).
 - **NH4:** Substantial outlier in June 2017 (1.00) and elevated value in April 2019 (0.29)
 - **NO3:** No substantial outliers just an increasing trend over time.
- Short term trend:
 - **P04:** Increasing
 - **NH4:** Decreasing
 - **NO3:** Increasing

No hydrochemistry data were available for upstream at Glenaboy_010 (Ballyclogh Br). For Glenaboy_020 it was observed that NO₃ was consistently elevated between 2016 and 2019 (Figure 2-3). It was found that PO₄ and NH₄ spiked together in June 2017 which may suggest an event such as a spill or discharge occurred. Values for PO₄ are generally not above the threshold but multiple significant high value events with no pattern lead to a high average PO₄ (Figure 2-1) and might suggest point rather than diffuse sources. Both NO₃ and PO₄ are therefore significant issues. Nitrate is consistently elevated and trending upwards. Additionally, nitrate levels are also the main factor that is driving the ecological waterbody status (Figure 2-4).

Status Iterations		
	SW 2013-2018	
Ecological Status or Potential	Moderate	🟡
Biological Status or Potential	Moderate	🟡
Invertebrate Status or Potential	Moderate	🟡
Supporting Chemistry Conditions	Pass	🟢
General Conditions	Pass	🟢
Oxygenation Conditions	Pass	🟢
Dissolved Oxygen (% Sat)	Pass	🟢
Other determinand for oxygenation conditions	High	🔴
Acidification Conditions	Pass	🟢
pH	Pass	🟢
Nutrient Conditions	Pass	🟢
Nitrogen Conditions	Moderate	🟡
Nitrate	Moderate	🟡
Ammonium	High	🔴
Phosphorous Conditions	High	🔴
Orthophosphate	High	🔴

Figure 2-4: Glenaboy_020 waterbody status details

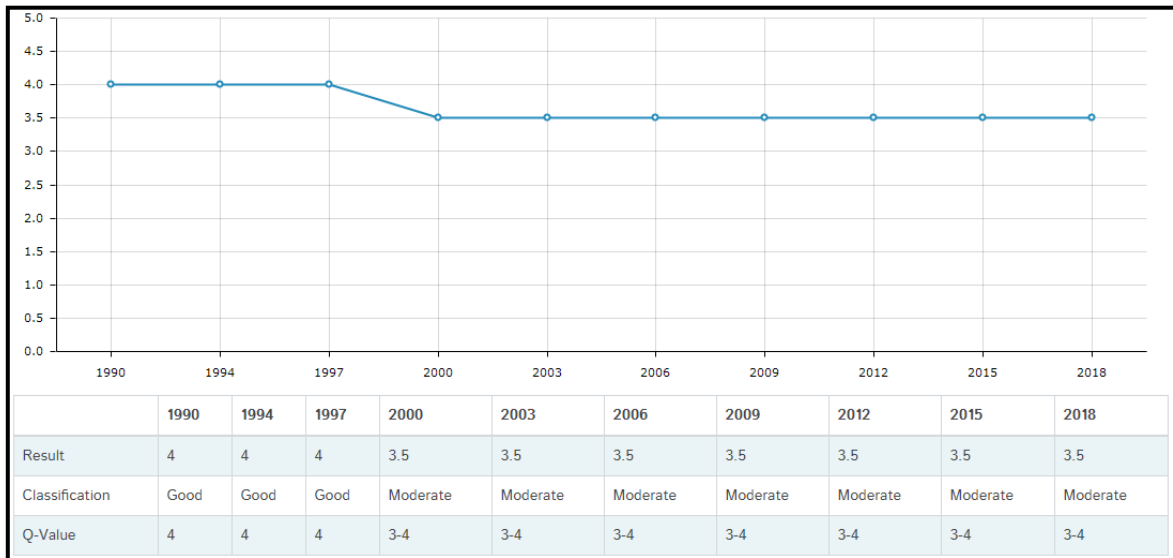


Figure 2-5: Glenaboy_020 Q value chart

2.3 Hydromorphology

MQI Class: High.

2.4 Protected areas

According to the EPA Glenaboy_020 is a Potential Waterbody Dependency for Tallow Drinking Water Protected Area (IEPA1_SW_G_074). The lower reaches of the waterbody are also part of an SAC.

3 Significant pressures

3.1 Initial EPA characterisation

Table 3-1: Glenaboy_020 Pressures details

Water body Name	Pressures			
	Category	Subcategory	Sig? (Y/N)	Pressure & Impact details
GLENABOY_020	Urban Run-off	Diffuse Sources Run-Off	Yes	Urban Run-off from Tallow has been identified as a significant pressure. Further investigation is required to determine the nature and extent of the impacts.

Urban run-off (diffuse) was determined as the significant pressure for the Glenaboy_020. Organic and nutrient pollution were determined as the likely impact from this pressure. However there is one WFD Section 4 discharge licence (Code: WPW/02/2004) located in Tallow town which represents one known point source in the sub-basin but this License has since been deemed obsolete as it is now discharging to a sewer system according to communications with Waterford LA (see Appendices 9.1). Additionally, communication with the Local Authorities identified there is another point source pressure upstream of South Br Tallow monitoring station (see Appendices 9.1). A discharge was addressed at this location here before, but it must be assessed again to be ruled out as a pressure during this catchment assessment. Other than these, the urban area occupies approximately 4% of the total area (ha) of the sub-basin and should be investigated as an urban catchment assessment to identify sources of nutrient pollution. The remaining sub-basin area is made up of pasture (82%), arable (5%), woodland-scrub (5%), mixed forest (4%), and coniferous forest (<1%) (Figure 3-1). In the context of the receptor assessment, the significant spike in PO₄ values may be due to urban run-off events or due to point or multi-point source discharges. However, the consistently elevated level of NO₃ may in part be due to the large proportion of agricultural area upstream of Tallow. Furthermore, the nitrate Pollution Impact Potential (PIP) maps suggest there is a large area of the sub-basin at high risk for nitrate loss to surface water (Figure 3-2). Fieldwork should include efforts to rule out pressures other than urban diffuse sources that may be causing a nutrient impact on the waterbody.

3.2 Conclusion on the Significant Pressures:

The urban area (Tallow) will require urban assessment to identify evidence of nutrient run off or point sources. If diffuse urban run-off is ruled out as the significant pressure, then local catchment assessment should be carried out upstream of Tallow urban area. This should include assessment at Ballyclough Br, so the pressures from Glenaboy_010 can be ruled out also. There is a large proportion of area that is under agricultural land use upstream of Tallow town and should be considered as a potential source of NO₃ also. The nitrate PIP map shown in Figure 3-2 shows there are substantial areas of high risk potential for NO₃ loss. A phosphate PIP map is shown in Figure 3-3 and indicates that diffuse P loss is a low risk in this PAA.

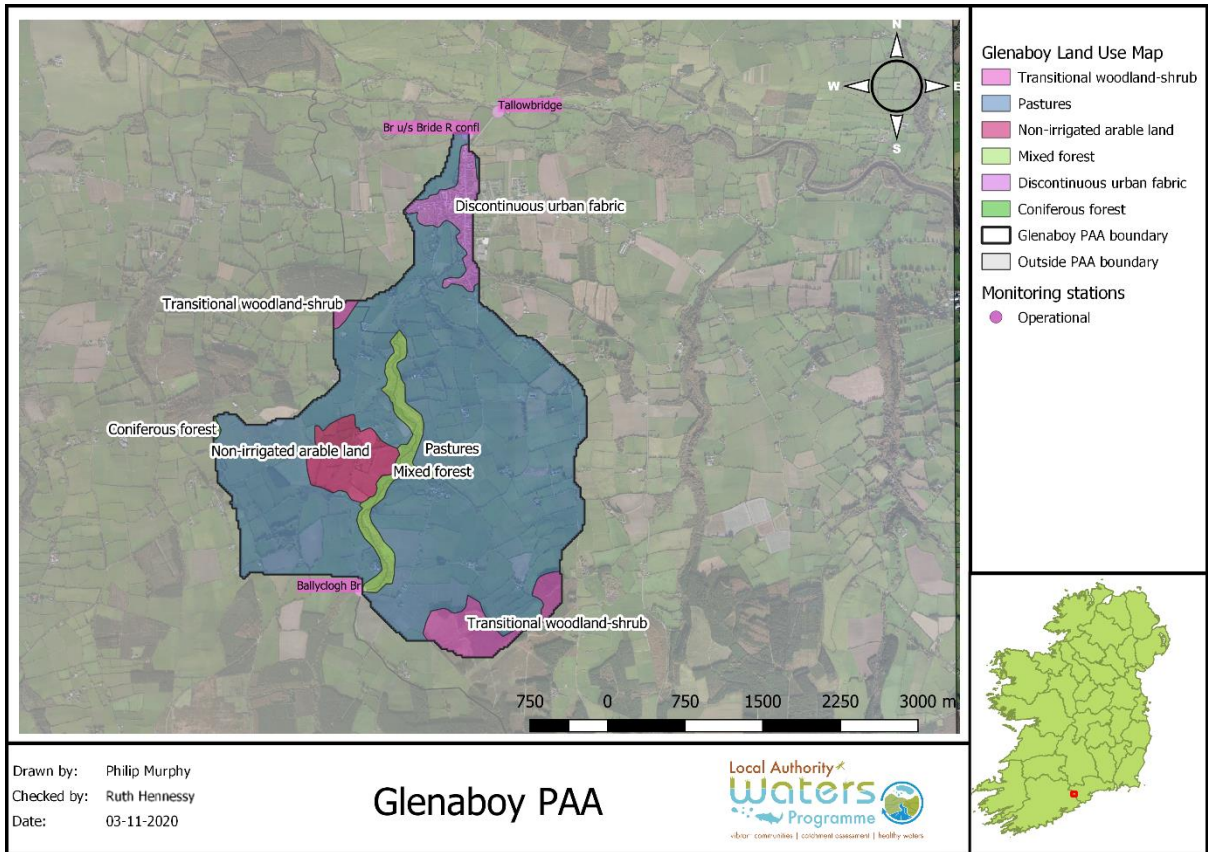


Figure 3-1: Glenaboy_020 sub-basin land use map

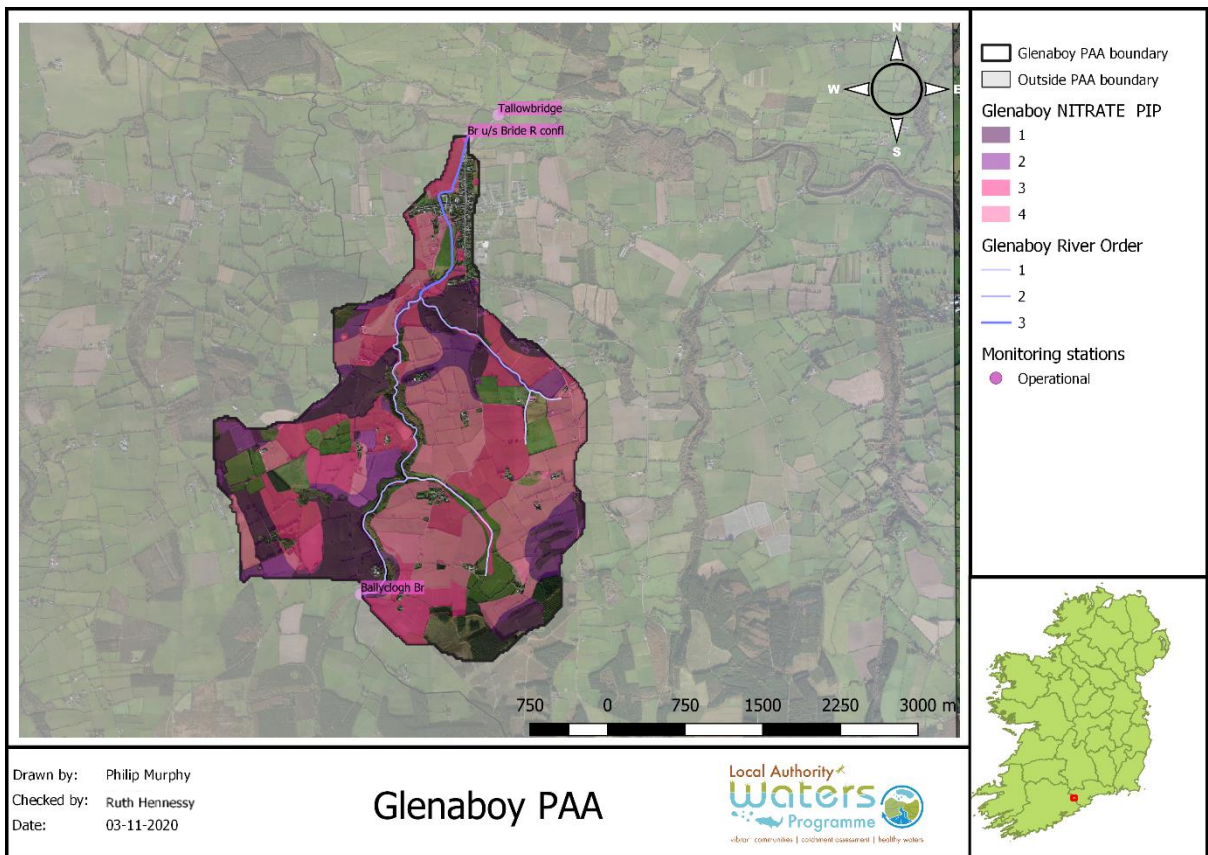


Figure 3-2: Glenaboy_020 sub-basin Nitrate PIP map

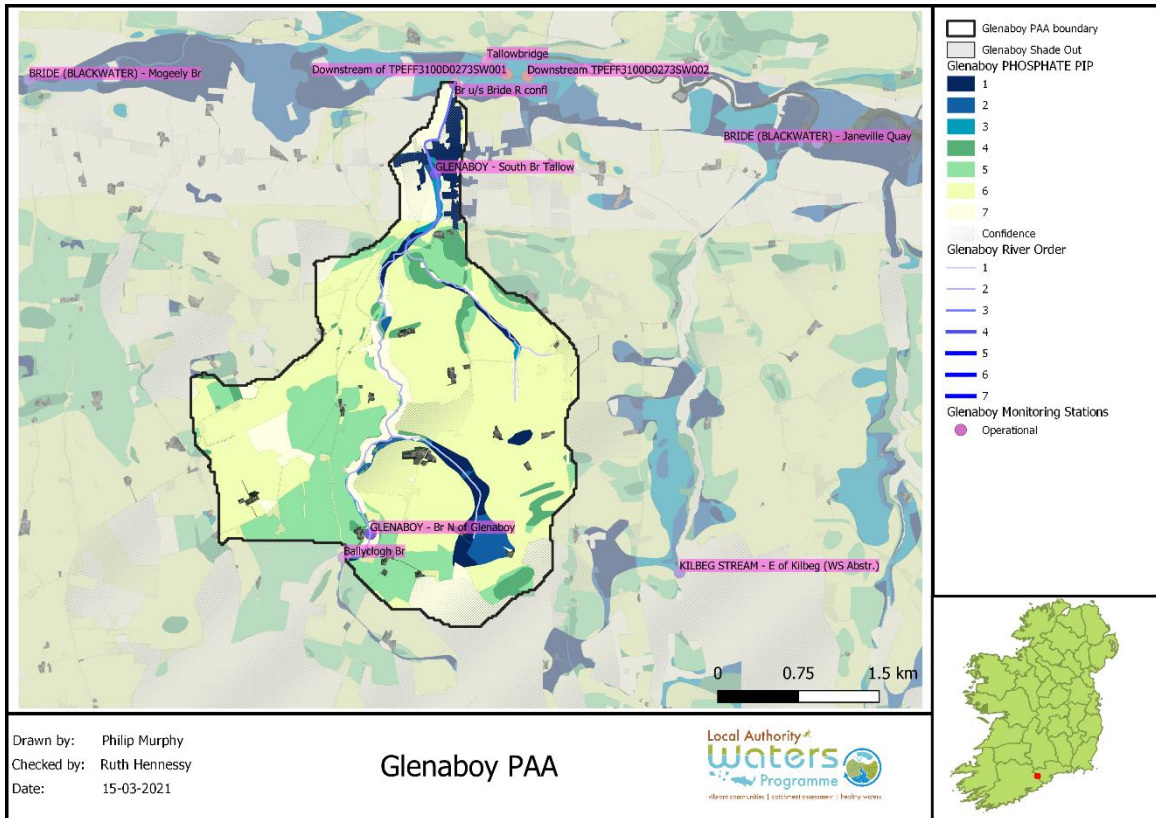


Figure 3-3 Glenaboy_020 sub-basin Phosphate PIP map

4 Pathways Information (diffuse pollution)

4.1 Aquifers and bedrock

Aquifers and bedrock maps are shown in Figure 4-1 and Figure 4-2. A Locally Important Aquifer (LI) is the predominant aquifer and accounts for approximately 93% of the total PAA area (approx. 896 ha of a total 960 ha). This aquifer is a *'bedrock which is Moderately Productive only in Local Zones'*. This aquifer is characterised as having a *'shallow zone of higher permeability within the top few meters of more fractured/weathered rock and higher permeability along fault zones'* and in terms of flow, *'recharge in the upper more fractured weathered zone is likely to flow along the relatively short flow paths and rapidly discharge to streams, small springs and seeps'*. This aquifer has low permeability and poor storage capacity and a low recharge acceptance. The bedrock is Devonian Old Red Sandstone. This aquifer will be selected as compartment 1. The most northern area of the Glenaboy_020 catchment (approx. 7% of the total area) is underlain by a regionally important aquifer (Rkd). According to Geological Survey Ireland (GSI), the characteristic flow for this aquifer type is as follows: *'most flow [is likely] occurring through the more permeable solutionally-enlarged interconnected fissure conduit zones, which may be several kilometres long. Furthermore, as it is karstified [...], karstification frequently results in the uneven distribution of permeability through the rock and the development of distinctive karst landforms at the surface (e.g. swallow holes, caves, dry valleys), some of which provide direct access for recharge/surface water to enter the aquifer'*. The bedrock is Dinantian Pure Unbedded Limestone. This aquifer will be selected as compartment 2. Pathway analysis will not capture point sources.

4.2 Karst features and/or sand and gravel aquifers

There are no known Karst features in the Glenaboy_020 sub-basin.

4.3 Soils and subsoils

Soils maps are shown in Figure 4-3 and Figure 4-4. Approximately 93% of the catchment area (893 ha) is characterised as a well-drained soil type. Alluvium soil types (7%) run parallel to the banks of the waterbody (65 ha) and there is a single pocket of peat (2 ha) in the East of the catchment (<1%). The predominant subsoil is TDSs (Till derived chiefly from Devonian Sandstone) which is characterised as moderate permeability and this is overlain by well-drained soil. It is important to note that the area of the catchment that is soil sealed is characterised as "Made". This area represents the urban land use area of Tallow. Made ground must be considered as a pathway as it was determined that urban (surface) runoff was a pressure. Made area is impermeable and makes up approximately 26 ha.

4.4 Pathways

Aquifer type and soil type were used to distinguish between two likely flow pathways i.e. compartments. There were two compartments identified;

- Compartment 1: Locally Important Aquifer (LI)
 - Sub compartment 1A: Where moderately permeable subsoils are overlain by well drained topsoil, the pathway is sub-surface/near surface flow.
- Compartment 2: Regionally important aquifer (Rkd)
 - Sub compartment 2A: Where moderately permeable subsoils are overlain by well drained topsoil, the pathway is groundwater flow.
 - Sub compartment 2B: Where Made area is present, the pathway is urban surface runoff.

The main pathways are **sub-surface/near surface** and **urban surface runoff**.

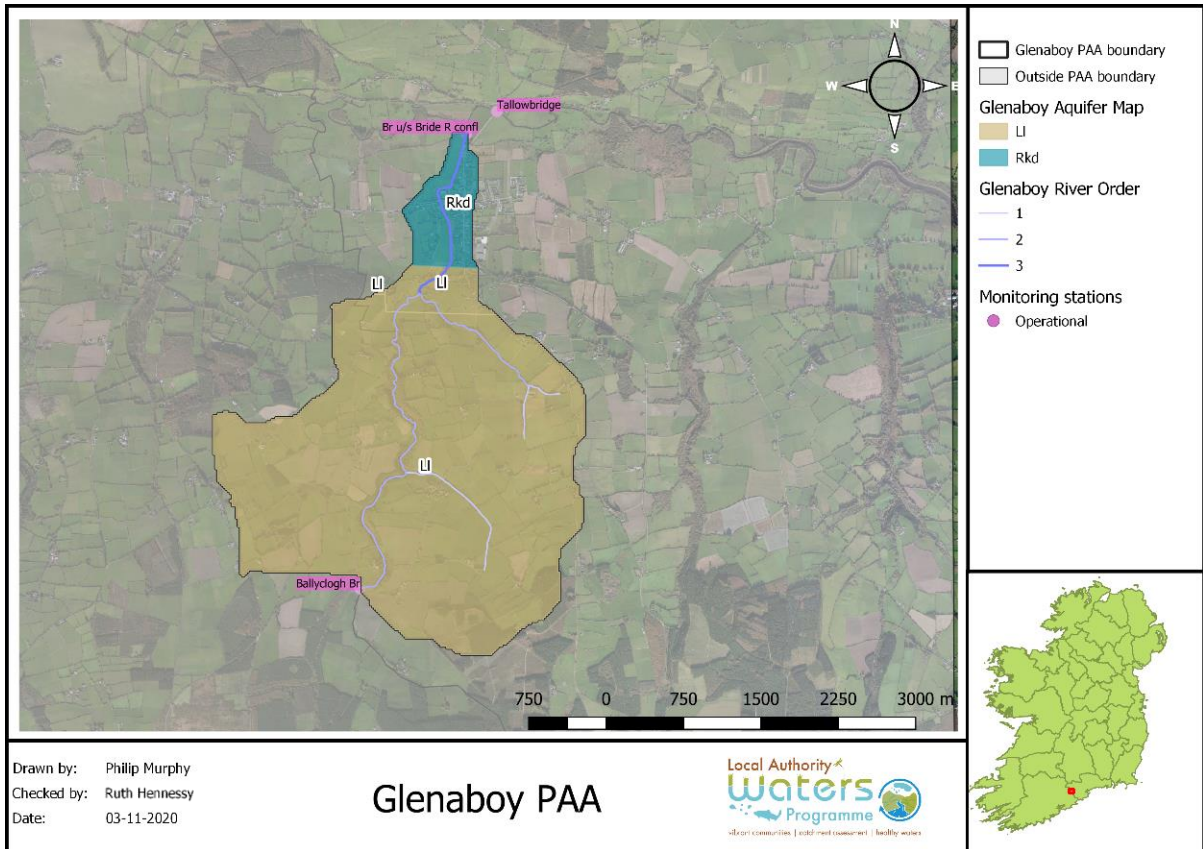


Figure 4-1: Glenaboy_020 aquifer map

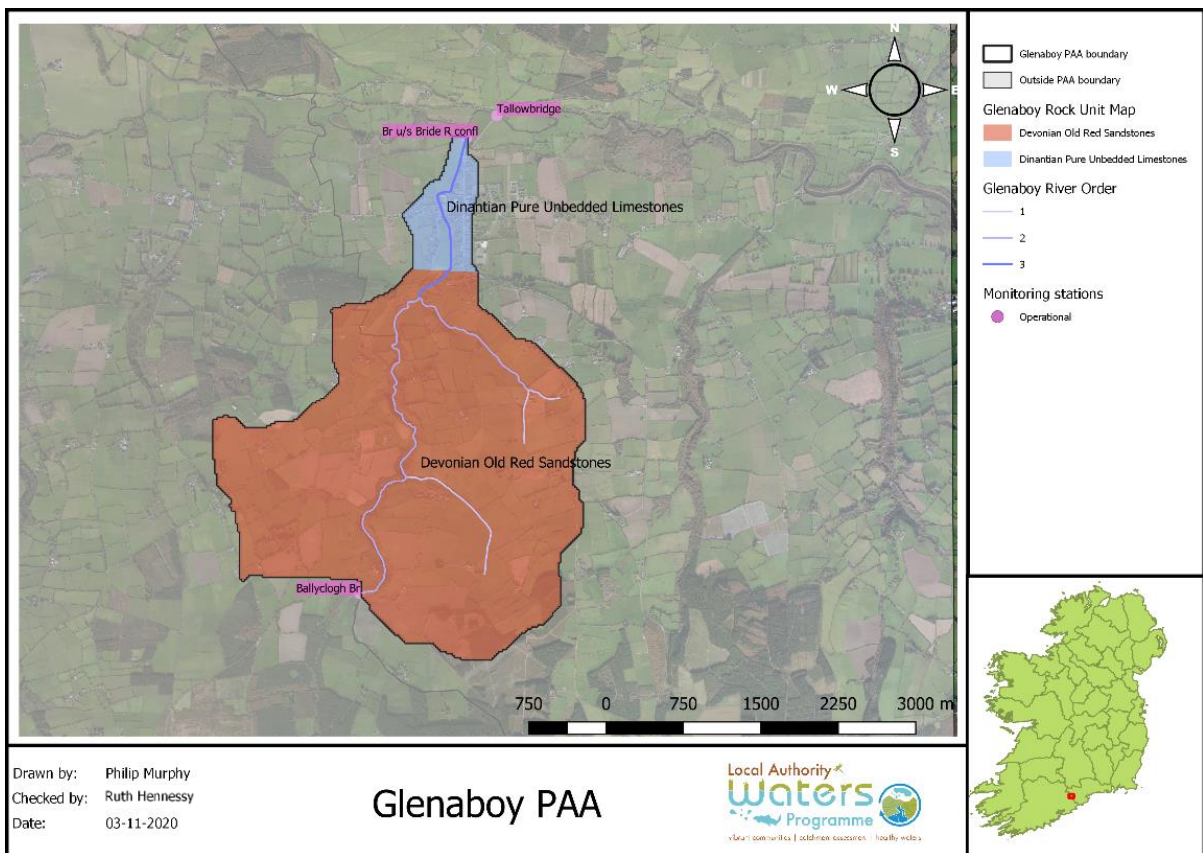


Figure 4-2: Glenaboy_020 bedrock map

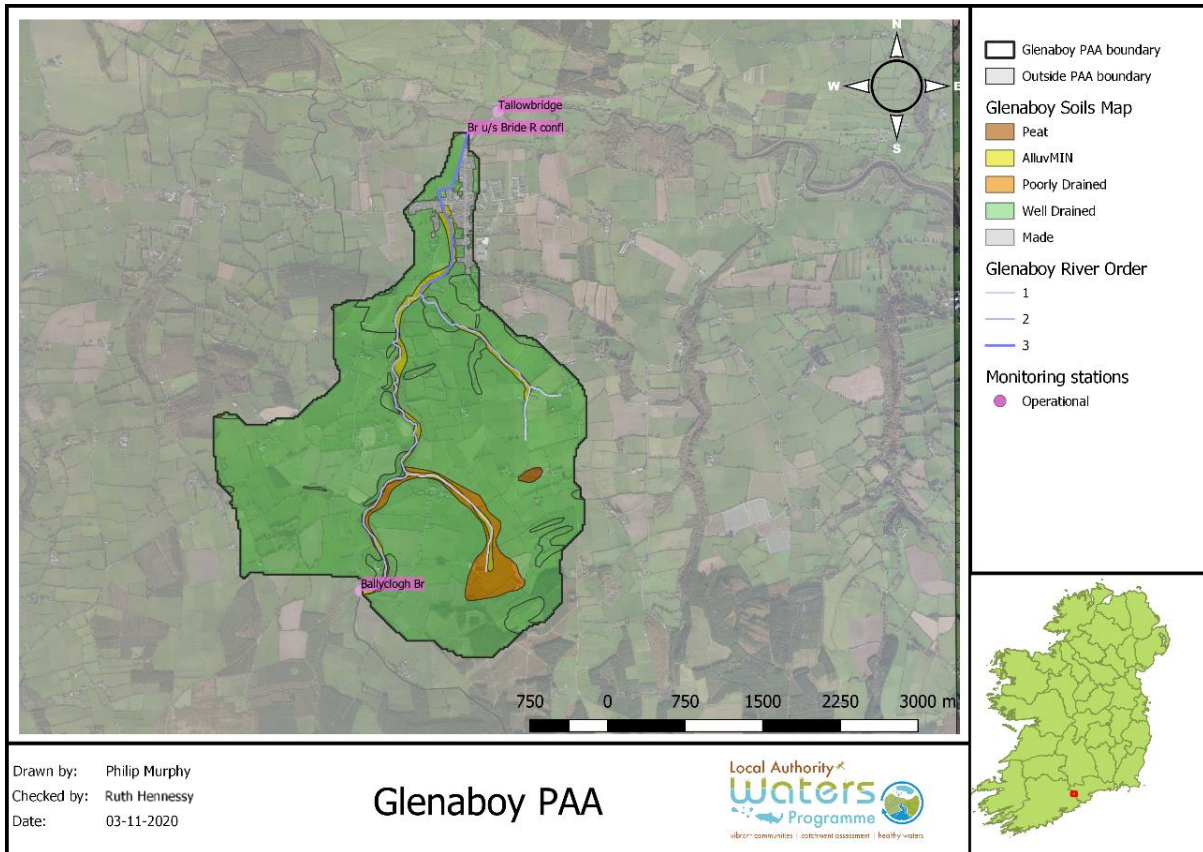


Figure 4-3: Glenaboy_020 soil map

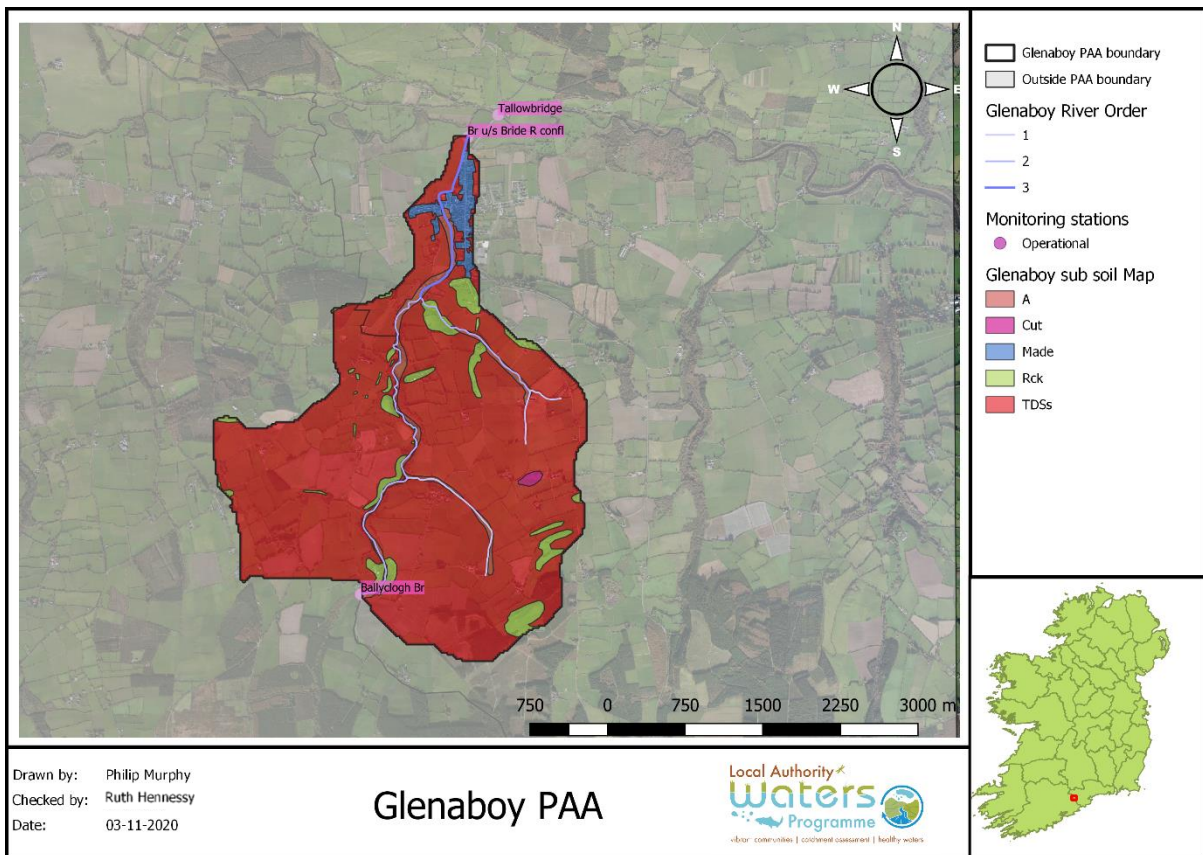


Figure 4-4: Glenaboy_020 sub-soil map

5 Interim conclusions on the PAA

The Glenaboy PAA is a single waterbody PAA (Glenaboy_020). Glenaboy_020 is an *At Risk* waterbody that has been consistently at Moderate ecological status since 2009. One of the main reasons it was selected as a PAA was to assess it as a “test case for diffuse urban issues”.

- Glenaboy_010 is *Not At Risk* and was at Good status in 2018 and it outside the PAA area.
- Glenaboy_020 is *At Risk*
- The Ecological status (SW 2013-2018) was Moderate – Br u/s Bride R confl monitoring station
- Consistently elevated levels of NO₃ and elevated levels of PO₄ are the significant issues.
- The significant pressure is Urban run-off (Initial Characterisation) and agriculture (Desk Study analysis).
- There is one single Section 4 licence discharge location in Tallow but this has been made obsolete.
- The land use in the catchment is predominately pasture based agriculture.
- The most likely pathway with respect to the significant issue is diffuse urban run off on Made area and sub-surface/near surface flow on pasture area and potentially point or multi-point sources.

6 Workplan

6.1 EPA further characterisation actions

Table 6-1: Glenaboy PAA further characterisation action details

WB Name	Id	Action	Responsible Organisation	Further Characterisation Action details
Glenaboy_020	FC000157	IA7 Multiple Sources in Multiple Areas	LAWPRO	Glenaboy_020 Aim: to identify driving factors behind urban diffuse (Tallow) pressures u/s and d/s. This could determine whether a catchment walk is necessary. If urban is not a problem then this will trigger a full catchment walk. Focus effort on high N PIP areas for surface water if urban is not the pressure. Details: Catchment walk (Full, starting at urban), SSRS results, at u/s and d/s monitoring. Collect field parameters, use field parameters to guide location of SSRS and water quality samples. Use monitoring to guide further assessment. If we can pin urban as the pressures then can go into detail.
	FC003502	IA6 Multiple Sources in Large Urban Area	LAWPRO	Diffuse Urban pressure to be investigated.

6.2 Local Catchment Assessment

- Follow guidance included in IA6 and IA7.
- Communicate with relevant agencies to gather any more information relating to urban run-off pressures.
- Carry out urban area local catchment assessment.
- Investigate point sources in Tallow area and identify potential surface run-off areas.
- Carry out SSIS and measure physio-chemical parameters at Br N of Glenaboy, South Br Tallow, and Br u/s Bride R confl monitoring stations to determine the current invertebrate status for the waterbody.
- Investigate potential point source upstream of South Br Tallow to identify if discharge is still occurring.
- Carry out SSIS and measure physio-chemical parameters at Ballyclogh Br monitoring station to rule out any pressures or impacts incoming from Glenaboy_010.
- Carry out multiple water chemistry samples over a number of months to determine whether nutrient issues are still significant.
- If urban areas are determined as not significant then use chemistry sample results, EPA hydro-tool, and load apportionment procedures to determined where the largest nutrient load is discharging from.

7 Review of possible mitigation options

- Measures implemented that prevent or mitigate impacts of urban run-off and point sources.
- Measures implemented that reduce or prevent diffuse NO₃.
 - Load apportionment calculation and information dissemination
- Measures that prevent or reduce PO₃ losses from point sources.

8 Communications

8.1 Community Information Meeting

- Meeting held: 10/02/2020 at The Enterprise Centre, Tallow, Co. Waterford.
- No of attendees: 10
- Issues raised at meeting
 - *There is invasive species (himalyan balsam, hogweed) along the river. Balsam was introduced by forestry to control growth of briars. Members of the community have been removing the balsam from the riverbank and sowing wildflower seeds.*
 - *Slurry spreading on hilly ground in wet weather is causing a problem*
 - *Farmers in the area would be interested in advisory services*
 - *The wastewater treatment plant was improved in 2016, the river has been much better since then.*
 - *Sediment is building up in the river and blocking the bridge eyes and causing flooding. Tidy towns have spoken to IFI about removing the gravels and plan get permission to do it this year*
 - *The river is spreading and widening out, too shallow for fish*
 - *A farmer in the catchment was deducted his SFP for working with the council and IFI to stop flooding*
 - *A vegetable processing facility in the town are managing their wastewater and landspreading it.*

9 Appendices

9.1 Communications with Local Authorities

During the desk study, communications with the local authorities identified an additional point source pressure immediately upstream of Tallow (approx. 150 m upstream of South Bridge Tallow monitoring station): *“After taking the samples there today we investigated a complaint the Council received about a pollutant discharge to the Glenaboy behind the old Bride View Stores. There is a discharge coming from a surface water pipe, the odour and appearance of the discharge is like your discharge to the sewer, and there is some small vegetable matter is visible on the riverbed”* - 21/04/2017. It was also identified that a substantial amount of work was carried out at the time to rectify this issue.

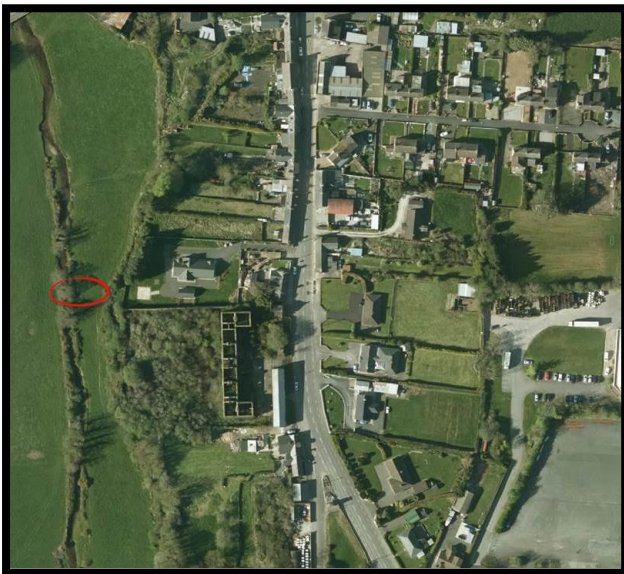


Figure 9-1: Location of discharge



Figure 9-2: Photo discharge 21/04/2017

In response to LAWPRO email requesting information on the WPW/02/2004 Section 4, Waterford Local Authorities responded on 10/02/2021 with the following:

“LAReferenceNo: WPW/02/2004, S4 Licence is obsolete as now going to sewer.”

9.2 Communications with Inland Fisheries Ireland

During the desk study, communications with Inland Fisheries Ireland identified that some measures have been proposed but not implemented yet: *“A number of measures were agreed with Tallow Tidy Towns group which it was proposed would be carried out during the summer months, including the manual removal of some riparian vegetation and fallen in-stream timber debris. I am not aware if any of the works were in fact carried out prior to the end of September. I am aware that one specific measure, namely the removal of accumulated bed material which is partially blocking one arch of the small bridge crossing of the Glenaboy river due north of the Glanbia store has not been completed and should therefore not be carried until summer 2021” - 05/11/2020*