Neutral or Beneficial Effect on Water Quality Assessment Tool

CONSULTANT AND CONSULTANT ADMINISTRATORS USER GUIDE

2026

Document Control

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Consultant training draft v1	September 2014	SCA Environment and Heritage Team*
Version 1	February 2015	WaterNSW Environment and Heritage Team
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Version 2	October 2021	WaterNSW Catchment Protection Team
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*From 1 January 2015, the Sydney Catchment Authority (SCA) joined with State Water to form WaterNSW, the new single organisation responsible for managing bulk water supply across the State. All references in this document to WaterNSW encompass the former SCA.

Contents

1. INTRODUCTION

1.1. ABOUT THE NorBE TOOL AND USER GUIDE

This Guide is to help you use the neutral or beneficial effect assessment tool (the NorBE Tool). It will take you through the NorBE Tool step by step, and includes information to help you understand how:

- the NorBE assessment process works
- to get registered, log in and change your password
- to create, complete and save a NorBE assessment
- to run a wastewater effluent model (WEM) for development proposals in unsewered areas
- to determine whether NorBE has been satisfied or not, and if your development will need to be referred to WaterNSW for concurrence
- to produce a variety of reports for individual assessments.

The NorBE Tool has been designed so that it will calculate some parameters automatically requiring the minimal amount of your input and prompts you when the proposal requires referral to WaterNSW for concurrence. The detailed decision-making process that underlines the Tool is documented in the 'Neutral or Beneficial Effect on Water Quality Assessment Guideline 2026', available on WaterNSW's website. The Guideline also provides relevant definitions and detailed supporting information.

The NorBE Tool has different levels of authorisations for access to, and use of, the Tool by consultants. Councils have access to the Tool and its use for them is mandatory.

The Tool will not make information from your assessment available to other consultancies or other third parties. WaterNSW will be able to view council's and consultant's assessments but will not be able to edit or modify them.

1.2. WHY DO A NorBE ASSESSMENT?

Under Part 6.5 of State Environmental Planning Policy (Biodiversity and Conservation) 2021 (the SEPP), all development in the Sydney drinking water catchment that requires consent must have a neutral or beneficial effect on water quality and as such requires a NorBE assessment to be undertaken. The Tool has been developed to support this requirement and its use is also required by the SEPP.

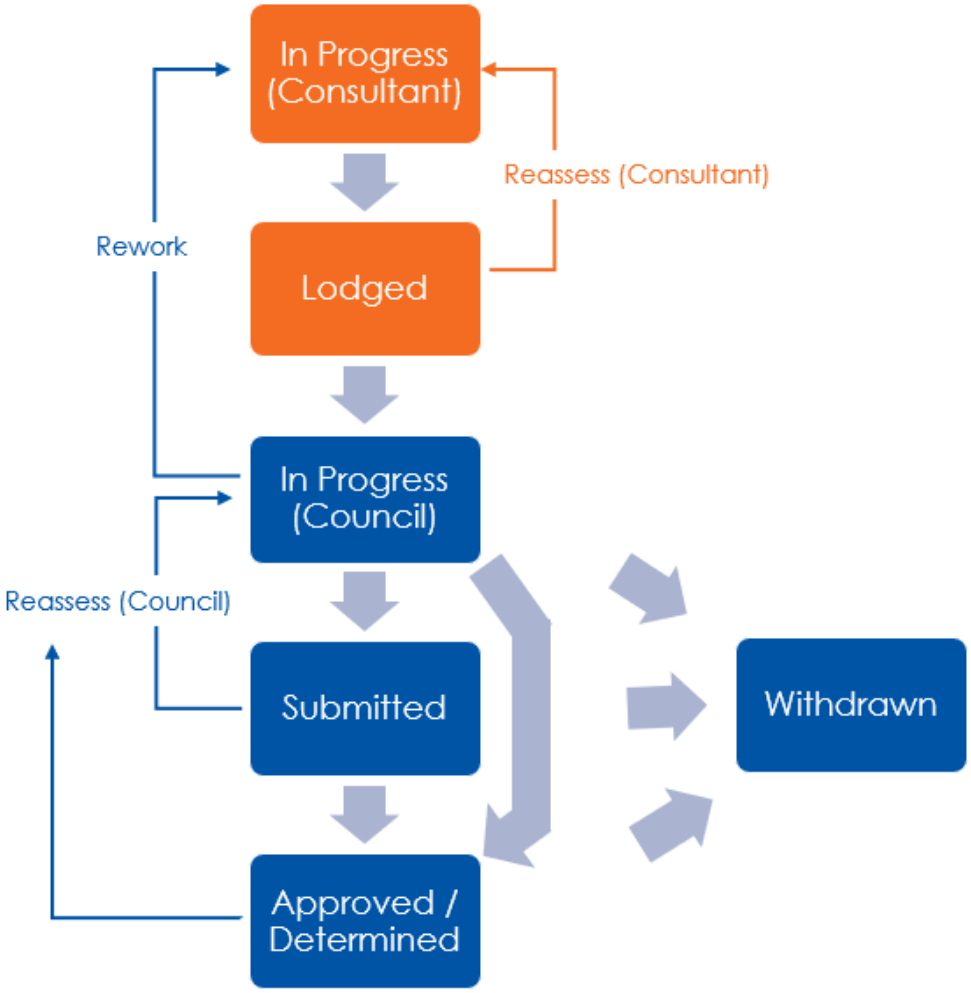
The Tool is also consistent with the Section 55 Notice issued under the Environmental Planning and Assessment Regulation 2021 to catchment councils by WaterNSW. The Notice specifies the circumstances in which WaterNSW's concurrence may be assumed.

Using the NorBE Tool means you will be able to undertake a full NorBE assessment and submit this to the relevant council, who will then review and 'certify' that the information is correct and consistent with the development application documentation and site constraints.

1.3. HOW THE NorBE ASSESSMENT PROCESS WORKS

There are two types of NorBE assessment – those undertaken (1) by councils and (2) by Consultants. The flow chart below summarises the NorBE assessment process. Consultant assessments are represented in **Orange** and council assessments are represented in **Blue**.

Consultants are able to reassess their own assessments that have been lodged until a council opens the lodged assessment. Council can also send back Consultant assessments for reworking.



1.4. USER HINTS AND TIPS

- A link to the NorBE Assessment Guideline is available on the bottom of each screen of the NorBE Tool.
- Use the **Filter** function on the Assessments Screen to search for a specific NorBE assessment or group of assessments. Assessments can be filtered by information in any of the columns on this screen including reference number, date created and the person who created the assessment. Using the filter function will only filter assessments that are in that screen:

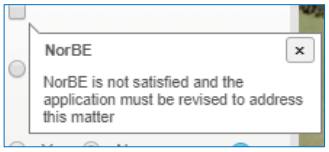
  Filter by: Search assessment

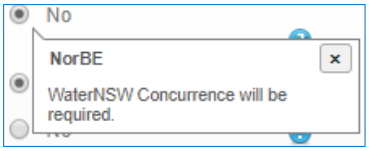
- Use the **Sort** function by clicking on a column heading in the Assessments Screen to sort the assessments by that column.

- Clicking **Next** when you've completed a screen will automatically save the information you have provided up to that point and move you along to the next tab. If you click **Close** before completing a screen or click on another tab, any information you have entered on that screen will be lost.

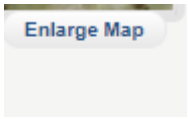
- All questions *must* be answered before progressing to the next screen. If you are unsure how to answer a question, or what is required, hover over the icon for further information.

- A dialog box such as the ones below will appear if, for example, NorBE will not be satisfied or WaterNSW concurrence is required. Other dialog boxes are described in this user guide:

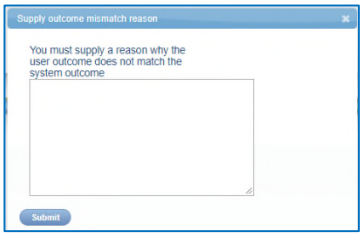




- When creating a wastewater effluent model (WEM) use the **Enlarge Map** button to view the map on a larger screen. Click the **Close** button or 'Esc' to return to the previous screen:



- A **Note** must be added to the dialog box when sending an assessment back for reassessment or reworking:



2. GETTING STARTED

2.1. WEB ADDRESS

To access the NorBE Tool go to https://norbe.waternsw.com.au.

2.2. REGISTERING AS A NEW ORGANISATION

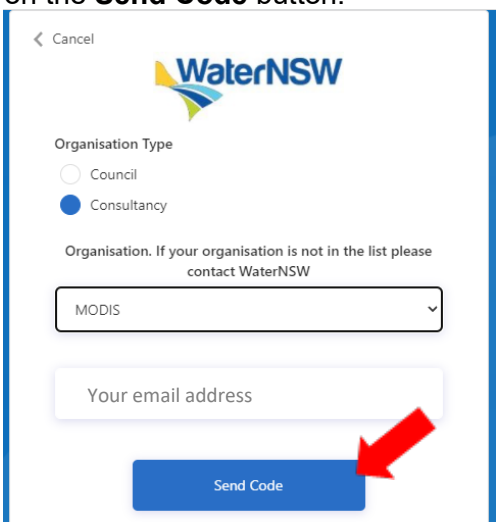
If your organisation has not previously applied to use the NorBE Tool, please contact WaterNSW using the email Environmental.Assessments@waternsw.com.au to request registration.

2.3. REGISTERING AS A NEW USER

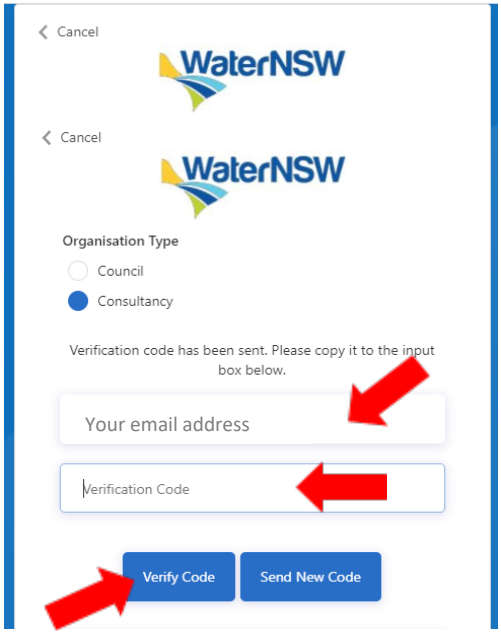
The first time you log in you will need to register with the NorBE Tool Administrator for your organisation (see Section 4). Note, your organisation must already be registered with WaterNSW and a NorBE Tool Administrator nominated to enable this registration process.

STEP 1: The first screen you will see is the Login Screen – click on **Sign up now** (circled in red):

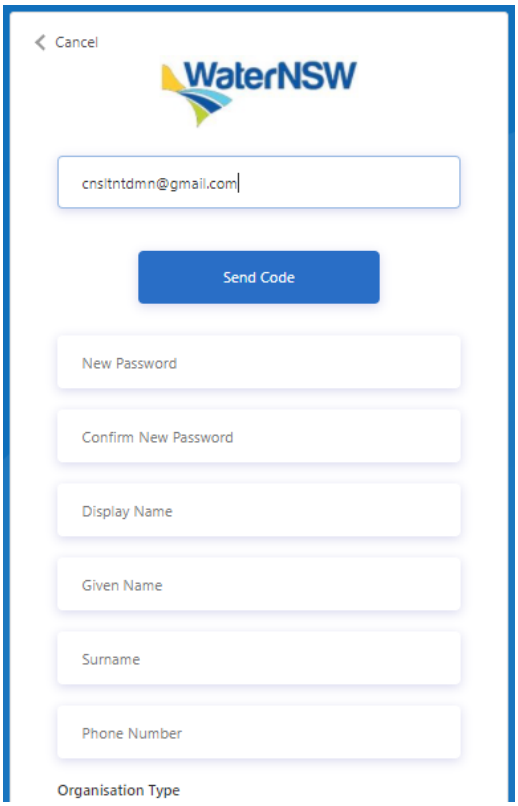
STEP 2: On the next screen, choose the 'Consultancy' radio button and your organisation's name from the drop-down list. Enter your **Email Address** and click on the **Send Code** button:



STEP 3: You will receive an email with your 'NorBE account email verification code'. The six-figure code is in this email. Enter the code and click on the **Verify Code** button (NB: if you are delayed in entering the verification code, you will need to click on the **Send New Code** button, and retrieve the new code from your email):



STEP 4: Complete your details, including setting a password – note the password must be in the format of 8-16 characters, containing 3 out of 4 of the following: Lowercase characters, uppercase characters, digits (0-9), and one or more of the following symbols: @ # $ % ^ & * - _ + = [ ] { } | \ : ' , ? / ` ~ " ( ) ; .. Then click on the **Create** button.



STEP 5: You will receive an email to say your registration was received by NorBE, and that another will be received when your 'account' has been approved and activated by your Consultancy's NorBE Tool Administrator.

In the meantime, your Consultant NorBE Tool Administrator will receive an email to advise them that you have applied to register as a user for that consultant organisation. The Administrator will need to login to the NorBE Tool to action the request.

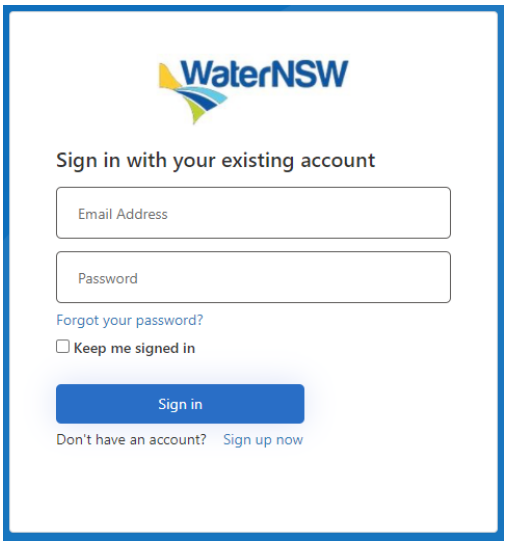
Your NorBE Tool Administrator can assist you with queries regarding your user details and level of authorisation within the Tool (see Section 4).

You can then login on the landing page.

2.4. FOR REGISTERED USERS

The first screen you see is the Login Screen. Enter your **Email Address** and **Password** as normal and click the **Sign in** button.

Note: you will automatically be logged out of the NorBE Tool after four (4) hours of inactivity.



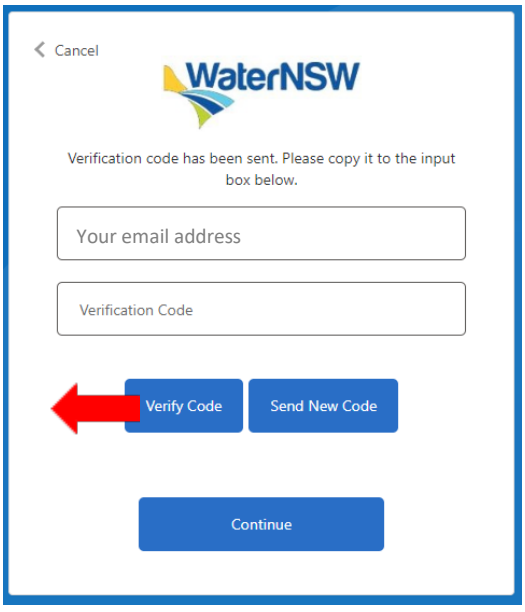
2.5. PASSWORD

2.5.1. CHANGE PASSWORD

STEP 1: To change your password, or if you have forgotten it, click **Forgot your password?** on the Login Screen.

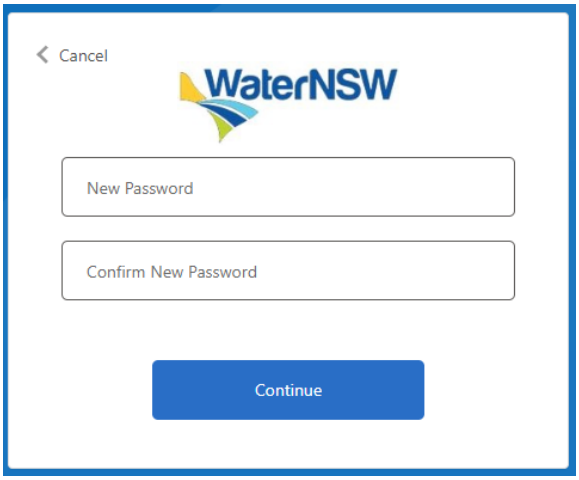
STEP 2: The next screen prompts you to enter your **Email Address** and click on **Send Code**.

STEP 3: You will receive an email with a Verification Code from 'Microsoft on behalf of WaterNSW – NorBE'. Enter that code and click on the **Verify Code** button.



STEP 4: Click on the **Continue** button.

STEP 5: Enter your **New Password** and **Confirm New Password** then **Continue**.



The NorBE Tool will take you back to the Login Screen where you can login using your new Password.

3. USER AUTHORISATIONS

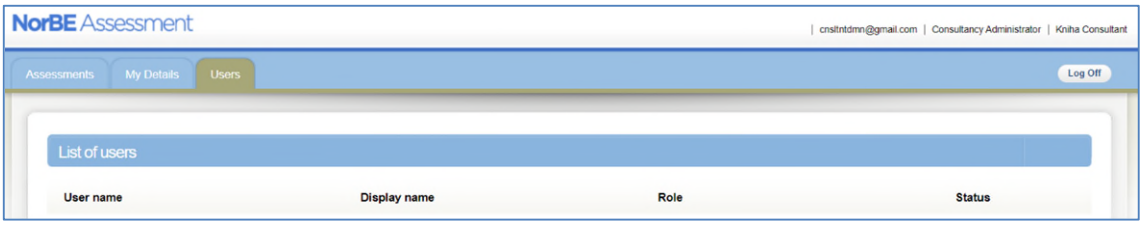
There are two levels of authorisations for consultants to access and use the NorBE Tool. These are Consultant Administrator and Consultant. NB: the role titles do not necessarily reflect your organisation's roles and are only relevant for use in the context of the NorBE Tool. These levels of authorisation are identified in the following table:

	Consultant Administrators	Consultants
View and update all assessments within their consultancy	✓	✓
Copy and delete any assessment within their consultancy	✓	✓
Create, update or delete notes they have created	✓	✓
Lodge any assessment created by their consultancy	✓	✓
Reassess any assessment lodged by a consultant	✓	✓
Approve/decline users within their consultancy	✓	X

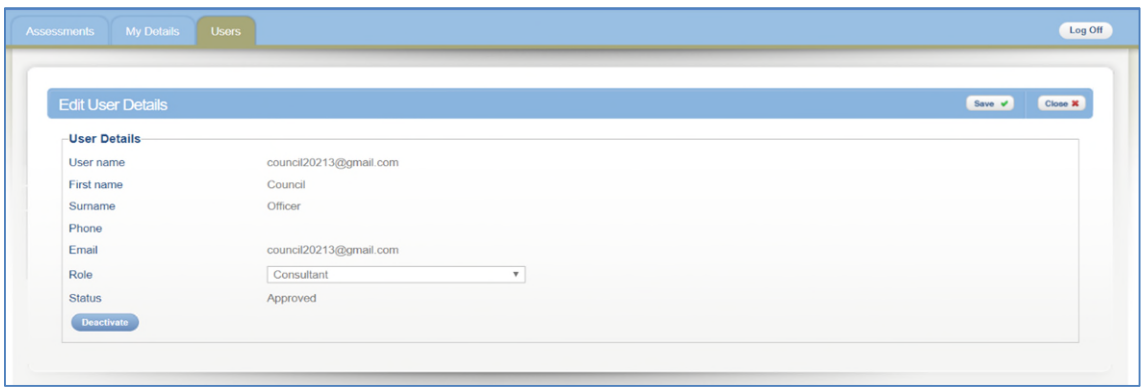
3.1. APPROVING NEW USERS (CONSULTANT ADMINISTRATOR)

Consultant Administrators have access to a **User** tab from the **Assessments** Screen that will allow them to view details of all NorBE users within their consultancy. When a new consultant user registers as a NorBE user, the Consultant Administrator will receive an email notification prompting them to approve the new user. The new consultant user will also receive an email once the Consultant Administrator either approves or rejects their request.

The list of users will show the users' display name, role and status; a role must be assigned for each approved user or they will not be able to login, irrespective of them receiving an email stating their registration is approved. Clicking on a username in the list will show more of that user's details.

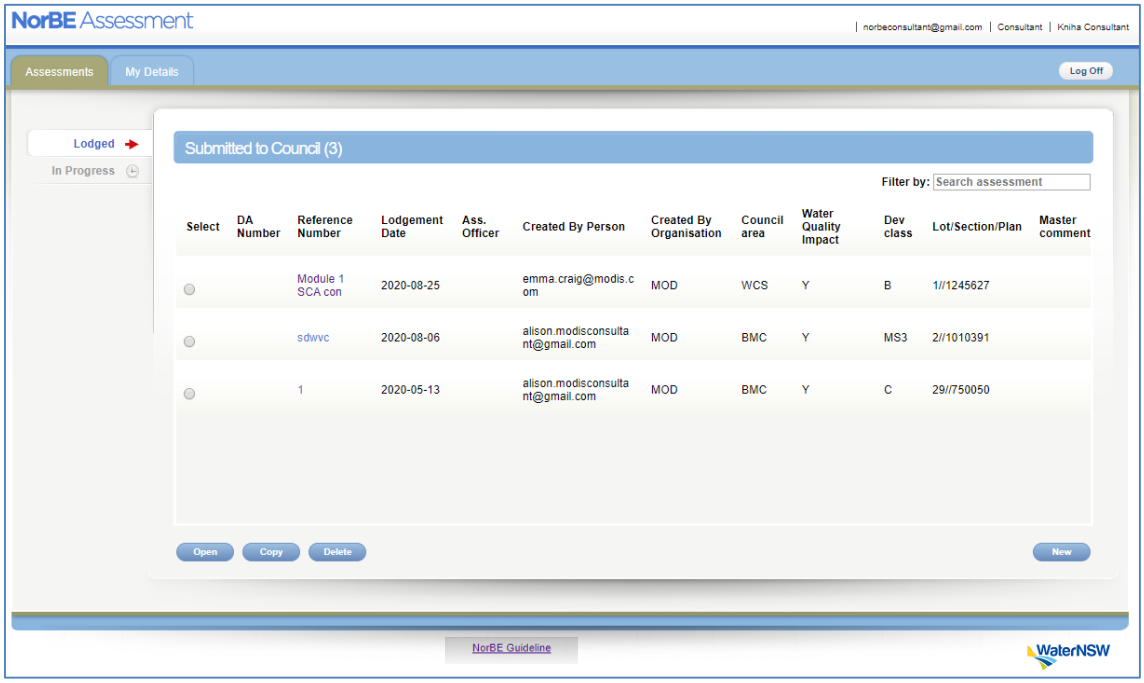


It is also possible for Consultant Administrators to change the status of a user and **Deactivate** an account from the **Users** menu e.g. when a user is no longer employed by the organisation, by clicking on the **Deactivate** button on that user's Detail screen. Once an account has been deactivated it is not possible to reactivate the account. Consultant Administrators can still view and edit the deactivated user's assessments for lodging.



4. ASSESSMENTS PAGE

Once you log in you will be taken to the **Assessments** screen. Two categories of Development Applications (DAs) are available for viewing from the Assessments screen. These are **Lodged** and **In Progress**. These can be viewed by clicking on the relevant tab in the menu on the left hand side of the screen.

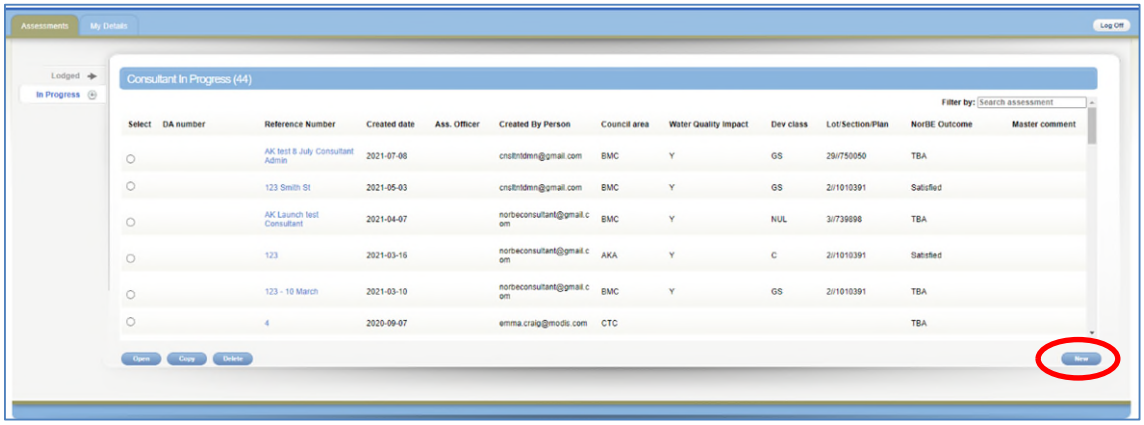


The other tab along the top of the screen is the **My Details** tab. Consultant Administrators will also have access to a **User** tab that will allow them to view all NorBE users within their consultancy (see Section 3).

Your username, level of access and consultancy name will appear on the top right-hand side of each screen while you are logged into the Tool.

The (consultant) **Reference Number** (CRN) represents the title of the assessment and is visible in the columns in the menu on the **Assessments** screen. Other columns also show the date the assessment was created and by whom. If an assessment is sent back for reworking from council, it will have a **Council DA number** attached to it that will appear here too. Other columns also show the date the assessment was created and by whom, the relevant **Development Class** and the **NorBE Outcome**.

- To start new assessments, click the **New** button in the bottom right hand corner of the screen (for further details on creating a new assessment see Section 5).



- To open an existing assessment either select the assessment using the radio button next to the assessment and click **Open** or click on the relevant **Reference number**.
- To copy an assessment, click the radio button next to the assessment and click on the **Copy** button.
- To delete an assessment, click the radio button next to the assessment and click on the **Delete** button.
- To search for an assessment on the list of assessments on the **Assessment** screen, type the DA number or CRN in the **Filter by:** box at the top right of the screen. Information from any column can be used to filter assessments.
- To **Sort** the list of assessments on the **Assessments** screen, click on any column heading.

4.1. IN PROGRESS

Once you have created a new assessment or if you are returning to continue an assessment it will sit in the **In Progress** screen. Click on the relevant CRN or alternatively you can select the assessment using the radio button and click the **Open** button.

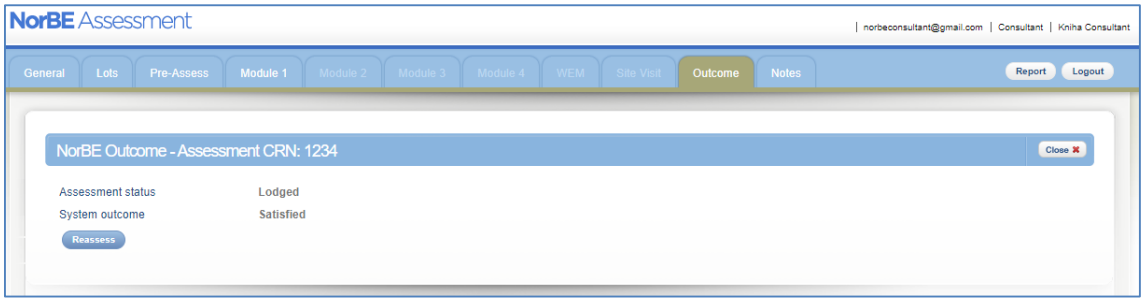
4.2. LODGED

Once an assessment is lodged with a council it will appear in the **Lodged** screen for further assessment by that council. Once an assessment has been lodged it cannot be deleted but can still be copied. Once a council opens your lodged assessment, it will disappear from the **Lodged** screen and you will no longer be able to view it.

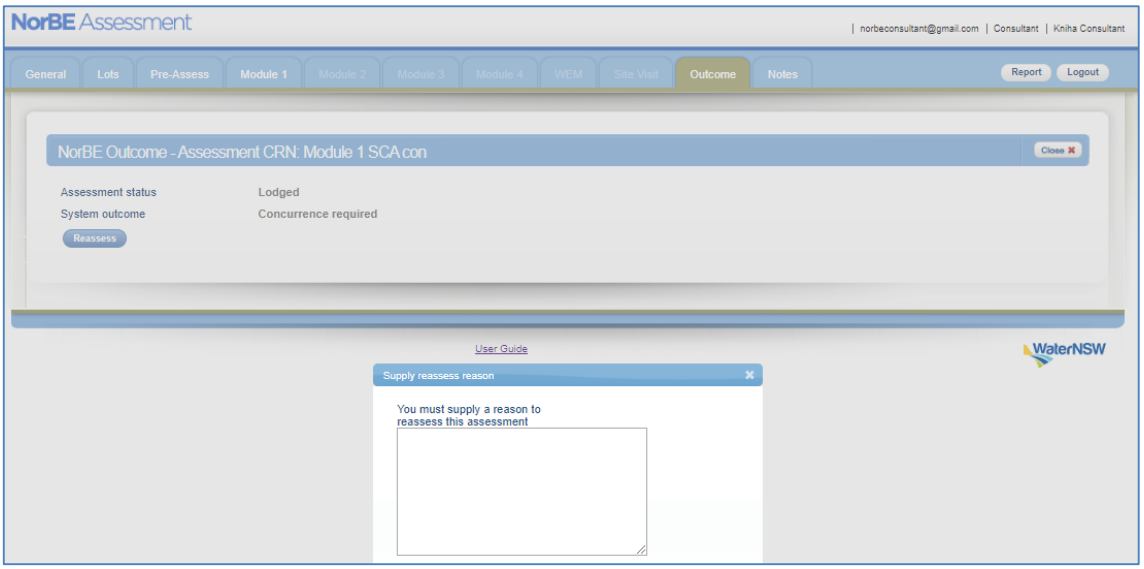
4.3. REWORK/REASSESS

An assessment lodged by a Consultant is 'read-only' for council users and cannot be edited or updated by them. If further amendments are required, the assessment will be sent back by council for reworking and it will re-appear in the **In Progress** screen. It will now also have a **Council DA number** attached to it. You will receive an email notification if your assessment is sent back by council for reworking.

Similarly, a Consultant or Consultant Administrator is able to recall an assessment to the **In Progress** screen if amendments need to be made by using the **Reassess** button from the lodged state (but only before council opens the assessment).

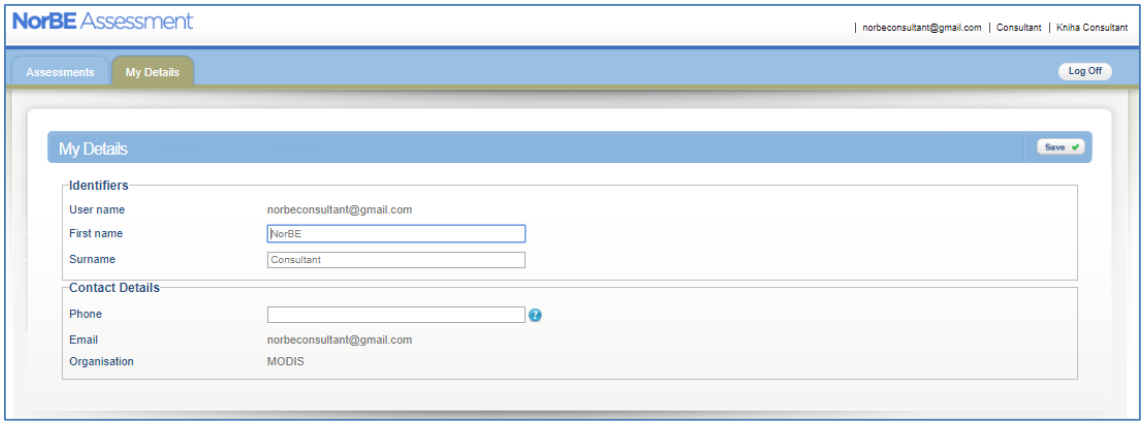


When an assessment is returned for reworking a **Note** must be added to the dialog box that appears before it can be sent.



4.4. MY DETAILS

To enter or edit your personal details, including your name and contact details, click on the **My Details** tab. Click on the **Save** button to save any changes you make. Note: you can't change your Username, Email or Organisation.

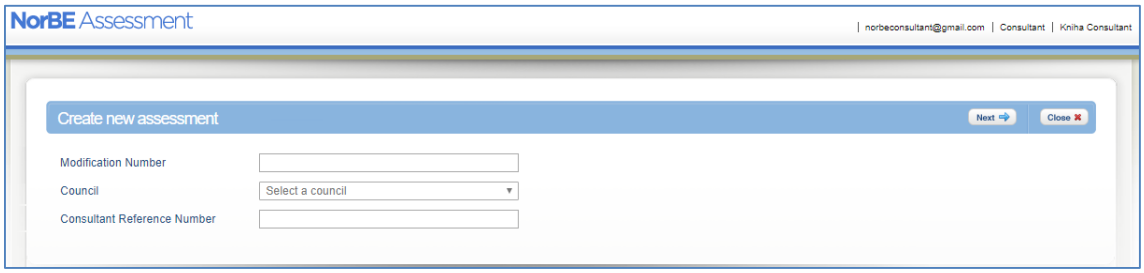


5. CREATING A NEW ASSESSMENT

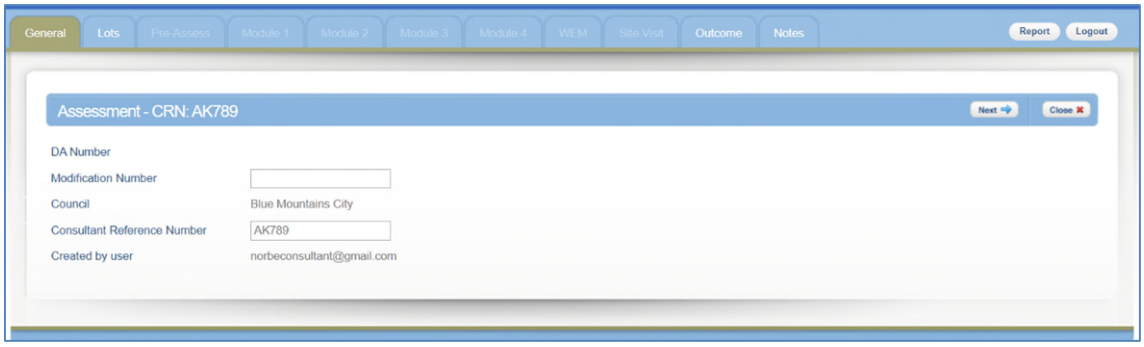
5.1. GENERAL

To create a new assessment click **New** on the **Assessments** screen (**In Progress** screen).

On the next screen you will need to enter a **Consultant Reference Number** (CRN; maximum 40 characters, no restriction on type of character) and a **Modification Number** if relevant to the application. The CRN can be the address of the proposal or any title using your organisation's reference system. Select the council to which the assessment will be submitted.



Click **Next** to open the **General** tab for the new assessment. The assessment will also now appear on the **In Progress** list. The **Consultant Reference Number** will then appear as the screen title in the blue banner.



Click **Next** to move to the **Lots** screen. To return to the **Assessments** screen, click **Close**. The new assessment with the CRN will appear here.

5.2. LOTS

Enter the Lot, Section and DP information and click **Add Lot**. If there is no Section number then leave this field blank. If a Lot is described by a letter (e.g. Lot A) rather than a number, be sure to enter it in its correct (upper) case.

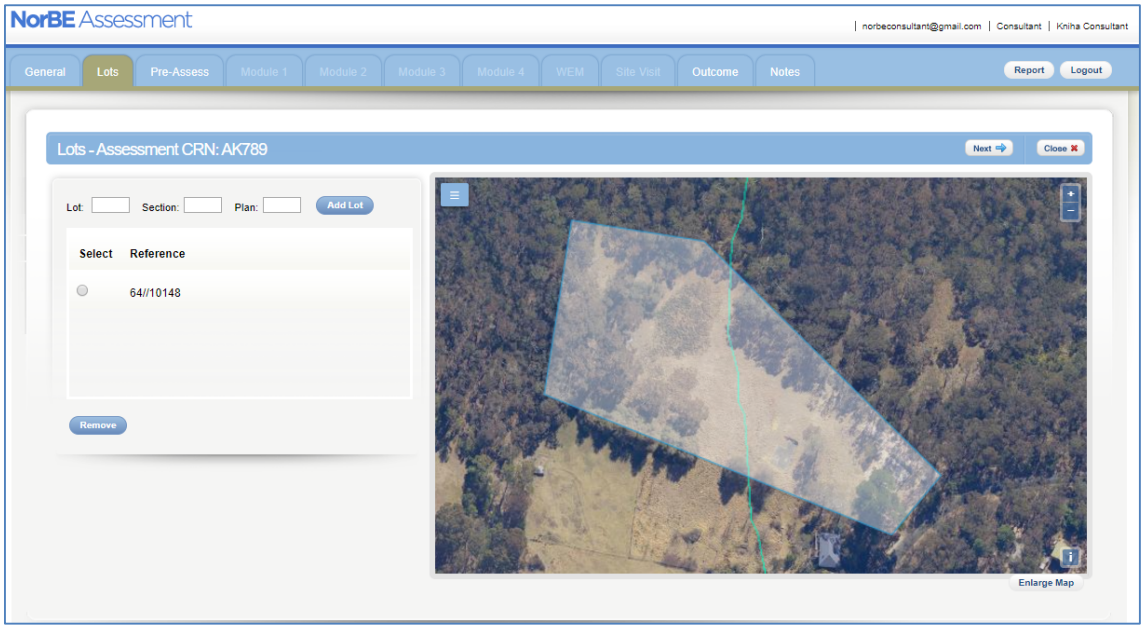
This information then appears in the Reference list.

If more than one lot is involved in the DA you can enter the Lot, Section and DP information for each lot, clicking on the **Add Lot** button each time until the list is complete.

To remove a lot from the list click the radio button next to the lot you want to remove and click the **Remove** button.

If you are dealing with a Strata Plan then only put in the Plan number.

When all relevant lots are added click **Next** to be taken to the **Pre-Assessment** tab (see Section 5.4 below).

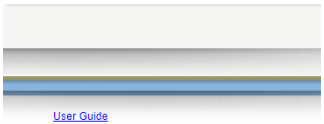


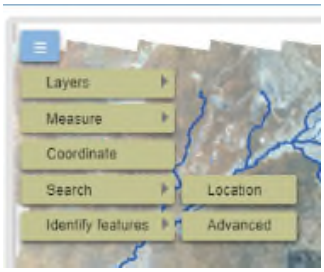
5.3. MAPPING VIEWER

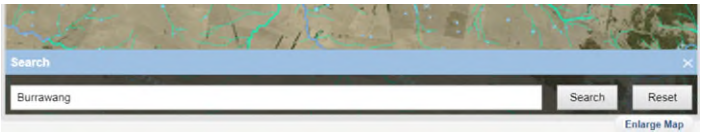
The mapping viewer on the right of the screen will automatically zoom in to the lot in question with a blue border showing every lot added.

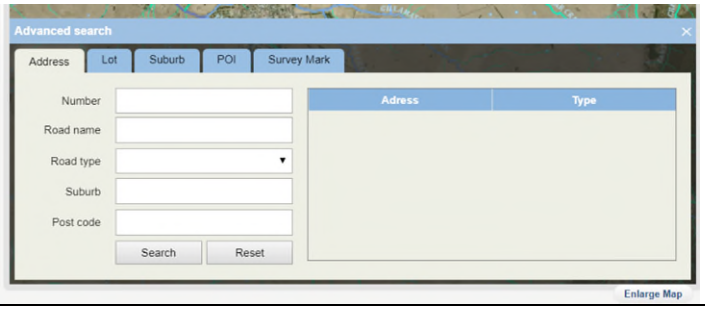
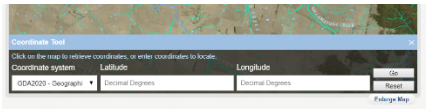
Click **Enlarge Map** to enlarge the map to fill the whole screen. Use the 'Esc' button on your keyboard or click on the **Close** button to return to the previous screen.

There are a number of features available in this mapping viewer:

Layers (Base map, imagery, outline of the catchment, NorBE (slope and aspect), cadastre and hydrography):    	Measure (area and distance): 

<table>
<tr>
<td>Search for location or address / Lot and DP:
 




</td>
<td>Identify the coordinates on a lot:
 

Identify features by point or including them in a rectangle or polygon:
 
</td>
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</table>

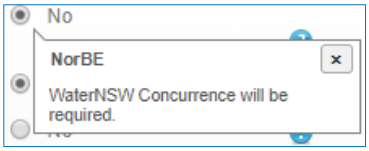
5.4. PRE-ASSESSMENT CHECKLIST

The **Pre-Assessment** checklist is the beginning of the NorBE assessment decision making process. All **Pre-Assessment** questions *must* be answered for *every* NorBE assessment. Entering all the relevant information into the **Pre-Assessment** checklist will help determine:

- if you need to continue to use the NorBE Tool for a Module 1, Module 2, Module 3 or Module 4 assessment
- whether information may be missing from the application
- whether the application will be referred to WaterNSW for concurrence.

To complete the **Pre-Assessment** checklist complete the following steps:

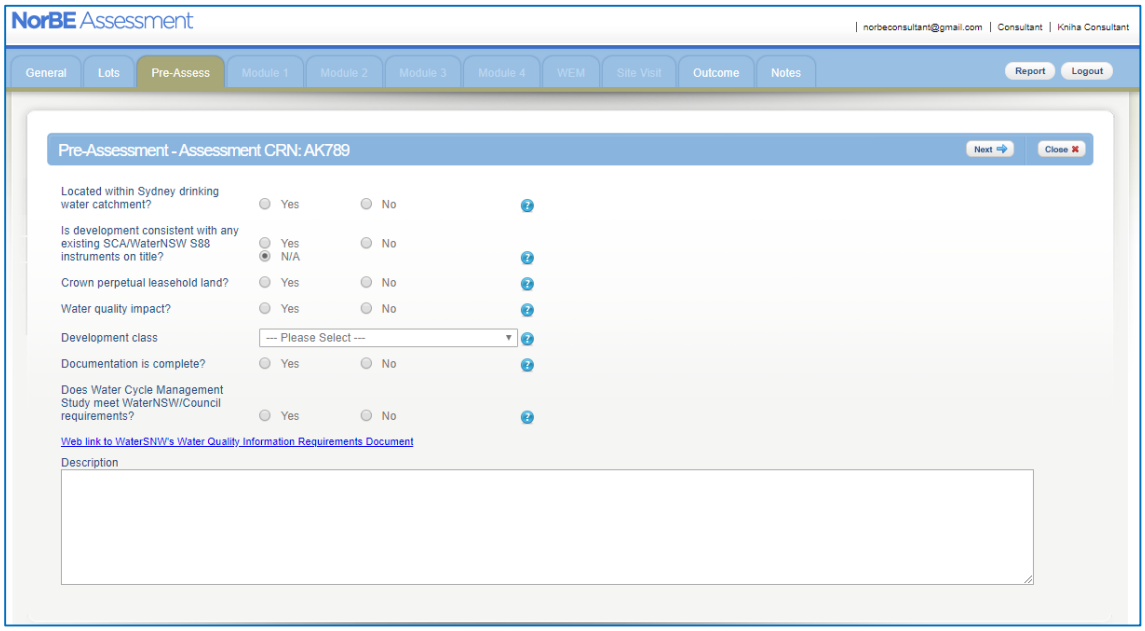
- Answer Yes or No to each question. If you are unsure hover over the icon for further information.
- Use the dialog boxes such as the one below to help complete the Pre-Assessment checklist:



- Include any additional information in the free text **Description** box (optional).
- Click **Next** to save your assessment and to automatically continue to the relevant Module screen.
- Or click **Next** and then **Close** to save and exit the assessment.

The following are the main considerations for the Pre-Assessment checklist:

- Is the development located within the Sydney drinking water (declared) catchment? If so a NorBE assessment is always required.



- Will there be a potential identifiable water quality impact (for both construction *and* operation)? If not, then NorBE will always be satisfied and you will be taken to the **Outcome** screen when you click **Next**.[1]
- Choose the appropriate **Development class** from the drop-down box. This will determine which Module the development is to be assessed under. For further information on development classes and Modules in the NorBE Tool, refer to the 'NorBE Assessment Guideline 2026' on WaterNSW's website. A more detailed description of the development types and which modules they correspond to is provided in Appendix 2 of this user guide.
- The Pre-Assessment cannot continue if all the documentation is not complete. It is essential that all documentation is available to be reviewed.
- It is also important that the documentation provided with the DA is consistent with WaterNSW's requirements for water cycle management studies (WCMS). A link to the document detailing the requirements is available on the **Pre-Assessment** screen.

5.5. MODULE 1 ASSESSMENT

After completing the Pre-Assessment checklist, the NorBE Tool will automatically take you to the **Module 1** screen for development classes in that module. Generally Module 1 developments are alterations and additions, urban dwellings or small urban subdivisions (less than four lots) that are sewered.

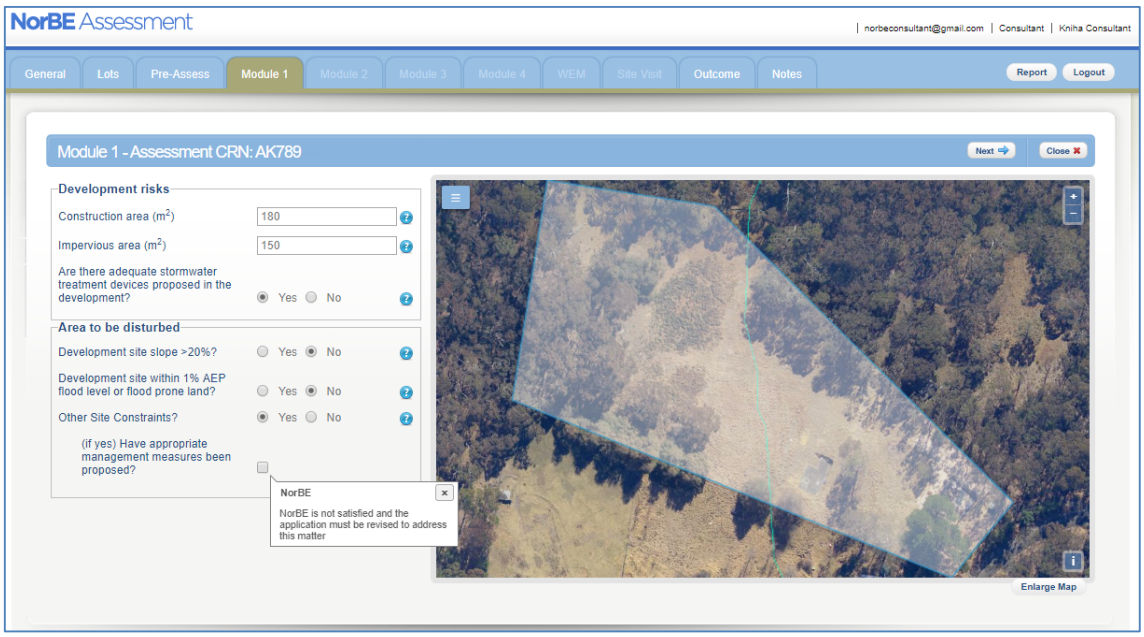
To complete a **Module 1** assessment, work through the following steps:

- Enter a value greater than 0 for the **Construction area** and **Impervious area** (both in square metres and as a whole number). The size of the area will help determine whether WaterNSW concurrence is required or which erosion and sediment control conditions will be placed on the development.
- Click the radio button to select whether:

[1] For minor alterations and additions to existing dwellings in unsewered areas (Module 2), where the proposed works do not alter the wastewater load or existing on-site wastewater management system, click the 'No' radio button for 'water quality impact' to ensure a wastewater effluent model is not required. A Specific note (see Section 8) is to be made for the assessment outlining the risk and management of other potential water quality impacts e.g. stormwater.

- adequate stormwater treatment devices have been proposed to be included as part of the development
- the development site slope is lesser or greater than 20%
- it's within 1% of AEP flood level or flood prone land, and
- there are any other site constraints.

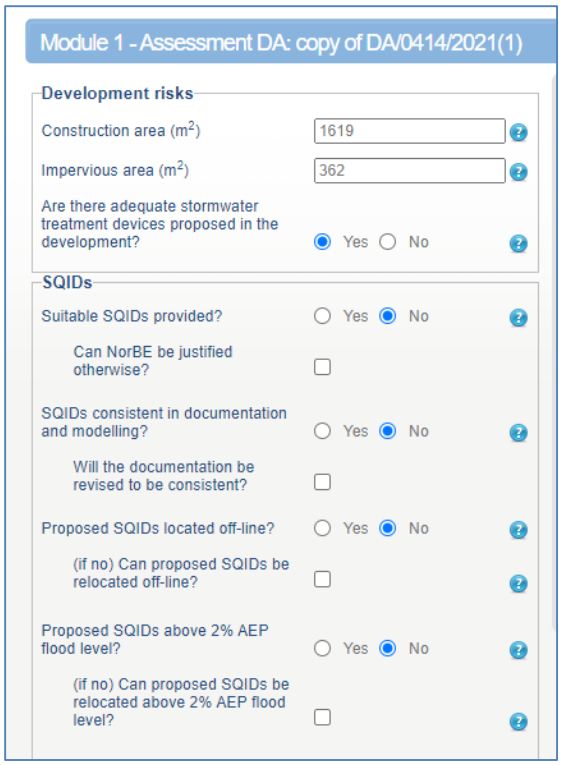
- If appropriate management measures have been proposed to address any other site constraints, **tick** the box (otherwise NorBE will not be satisfied).



- Click **Next** to be taken to the **Outcome** tab once you've answered all Module 1 questions (see Section 9 for further detail on the NorBE **Outcome** tab).
- Click the **Report** button to download an assessment report in PDF format in a separate window, which will provide all details entered for the assessment. This can be downloaded at any stage during the assessment. You can either save this electronically or print a hard copy (see Section 11 for more details).

The following are the main considerations when completing a Module 1 assessment:

- A value of greater than zero must be entered for the impervious and construction areas otherwise an error message will be displayed. WaterNSW concurrence will be required if the impervious or construction areas are 2,500 m^2 or greater.
- If the proposed Impervious area is greater than 250 m^2, supplementary questions will appear regarding 'SQIDs' – Stormwater Quality Improvement Devices. If the answer to any of these questions is 'No', further secondary questions will appear (see figure right).
- If adequate stormwater treatment devices / SQIDs are not proposed, then NorBE will not be satisfied, and the development will have to be revised.
- WaterNSW strongly discourages development on sites with slopes greater than 20% and a condition will automatically be set for developments that have slopes greater than 20%.



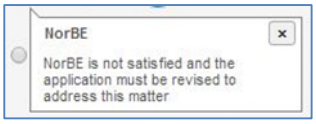
- If there are other site constraints, NorBE will not be satisfied unless appropriate management measures have been proposed.
- Use site plans and aerial photography and confirm information in the DA through a site inspection (see Section 7).

5.6. MODULE 2 ASSESSMENT

After completing the Pre-Assessment checklist, the NorBE Tool will automatically take you to the **Module 2** screen for development classes in that module. As a rule Module 2 developments are alterations and additions, rural dwellings and small rural subdivisions (less than 4 lots) that are unsewered.

To complete a **Module 2** assessment, complete the following steps:

- Choose the **Development site slope** from the drop-down list.
- Enter a value greater than 0 for the **Construction area** and **Impervious area** (in square metres and as a whole number). The size of the area will determine whether WaterNSW concurrence is required or what condition will be placed on the development. As for **Module 1** above, supplementary questions regarding SQIDs will appear for Impervious Areas greater than 250 m^2.
- Choose a radio button option (Yes or No or N/A) to each question.
- Ensure that you address any issues if the following dialog box appears, this usually occurs when secondary questions appear where a site issue has been identified.

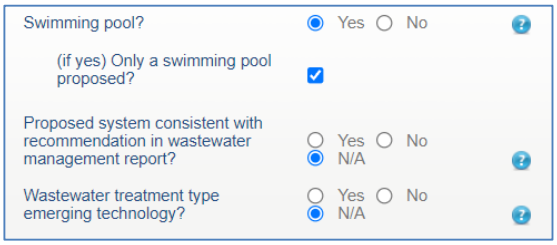


- Once you've answered all Module 2 questions click **Next**. This will usually take you to the wastewater effluent model (**WEM**) tab (see Section 6 for further detail on the WEM); otherwise, the Tool will take you directly to the **Outcome** tab (see Section 9 for further detail on the **Outcome** tab).
- Click the **Report** button to download an assessment report in PDF format in a separate window, which will provide all details entered for the assessment. This can be

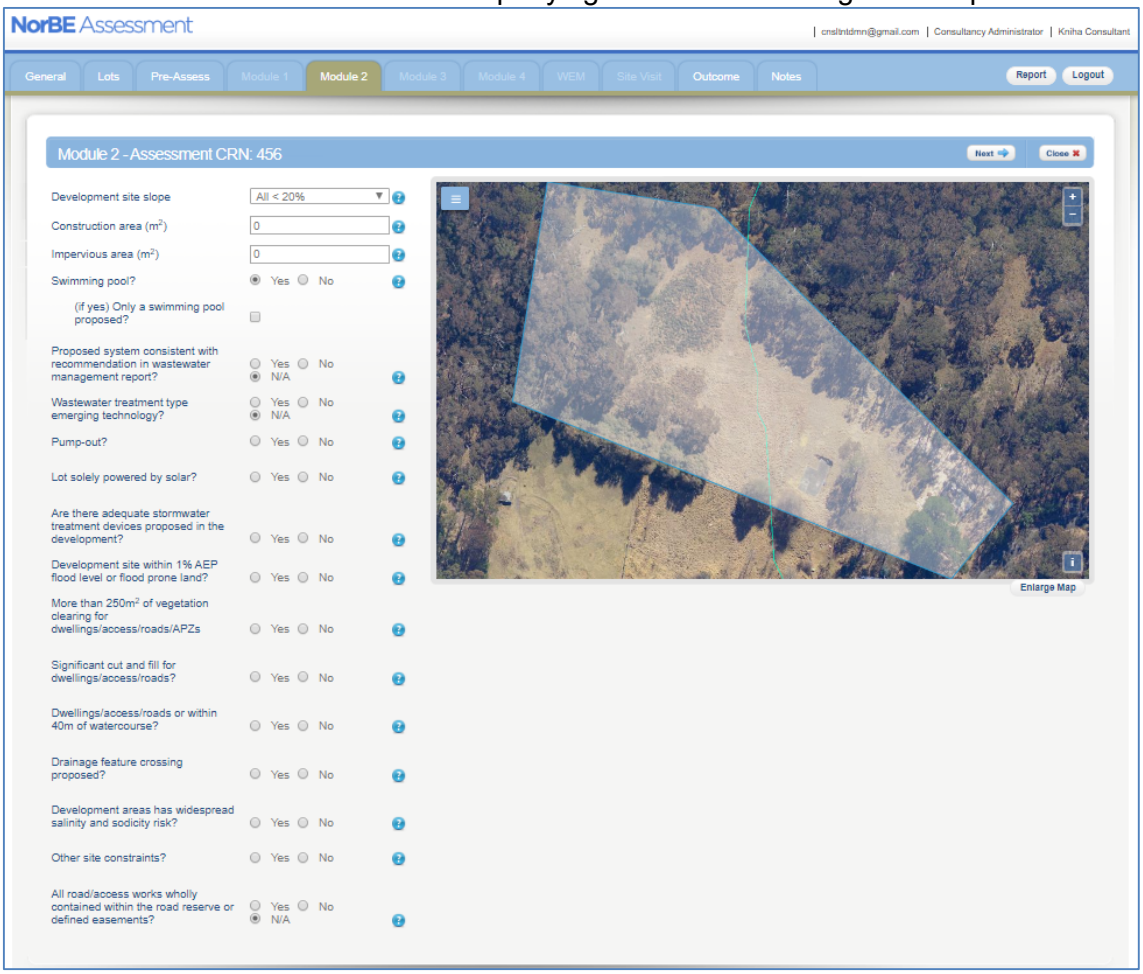
downloaded at any stage during the assessment. You can either save this electronically or print a hard copy (see Section 11 for more detail).

The following are the main considerations when completing a Module 2 assessment:

- WaterNSW strongly discourages development on sites with slopes greater than 20% and a condition will automatically be set for developments that have slopes greater than 20%.
- WaterNSW concurrence will be required if the construction area is greater than 2,500 m^2.
- An assessment can be completed for proposals that involve *only* a swimming pool (i.e. no on-site wastewater disposal). An 'N/A' radio button appears if both the 'Swimming pool?' and '(if yes) Only a swimming pool proposed?' questions are answered positively (see figure right).



- The wastewater system must be the same in both the DA and the accompanying wastewater management report.



- The NorBE Tool has been designed to assess standard treatment and disposal systems. If the technology proposed is emerging or new, you will have to refer the assessment to WaterNSW.
- WaterNSW does not support pump-out systems unless it is proposed in an area that is likely to be sewered in the near future. If there is no other viable on-site wastewater system and/or council DCP allows for pump-outs contact WaterNSW for advice.

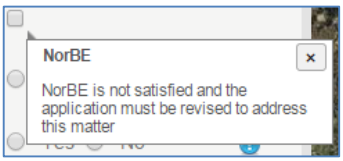
- If there are other site constraints NorBE will not be satisfied unless appropriate management measures have been proposed. Use site plans and aerial photography and confirm information in the DA through a site inspection (see Section 7).

5.7. MODULE 3 ASSESSMENT

After completing the Pre-Assessment checklist, the NorBE Tool will automatically take you to the **Module 3** screen for development classes in that module. As a rule, Module 3 developments are large urban subdivisions (4 lots or more) that are sewered.

To complete a **Module 3** assessment, complete the following steps:

- Chose the **Development Site Slope** from the drop-down list.
- Select a radio button option (Yes or No or N/A) to each question, including whether the development site is within 1% AEP flood level or flood prone land.
- Select a radio button option (Yes or No or N/A) to each question within the Sewerage Risks, Stormwater Modelling Analysis and Site Observation sections.
- As for the Modules above, supplementary questions regarding SQIDs will appear for Impervious Areas greater than 250 m^2.
- You will be required to use stormwater quality modelling e.g. MUSIC software to assess stormwater impacts and management measures where the proposed impervious area is greater than 2,500 m^2 (refer to WaterNSW's 'Using MUSIC in Sydney's Drinking Water Catchment' guide for information on appropriate modelling where the impervious area is less than 2,500 m^2).
- Ensure that you address any issues if the following dialog box appears:

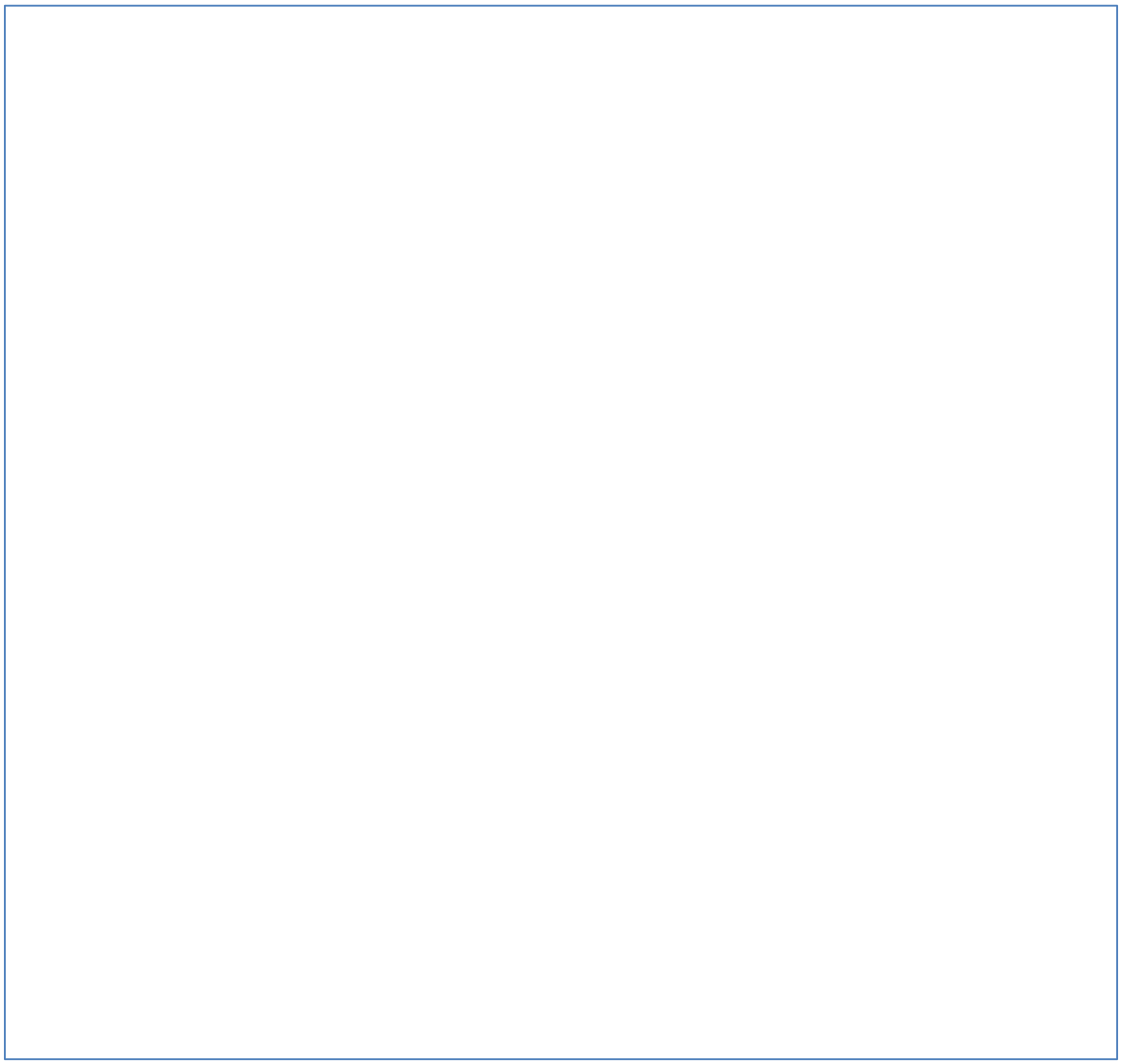


- Click **Next** to be taken to the **Outcome** tab once you've answered all Module 3 questions (see Section 9 for further detail on the **Outcome** tab).
- Click the **Report** button to download an assessment report in PDF format in a separate window, which will provide all details entered for the assessment. This can be downloaded at any stage during the assessment. You can either save this electronically or print a hard copy.

The following are the main considerations when completing a Module 3 assessment:

- WaterNSW strongly discourages developments on sites with slopes greater than 20%.

- If there are other site constraints NorBE will not be satisfied unless appropriate management measures have been proposed. Use site plans and aerial photography and confirm through a site inspection (see Section 7).



- Ensure you complete a site inspection before finalising the assessment to confirm the desk top assessment accurately reflects the site.
- The capacity of council's sewerage system infrastructure has to be considered for large subdivisions.
- A Module 3 assessment will **always** need to be referred by Council to WaterNSW for concurrence.

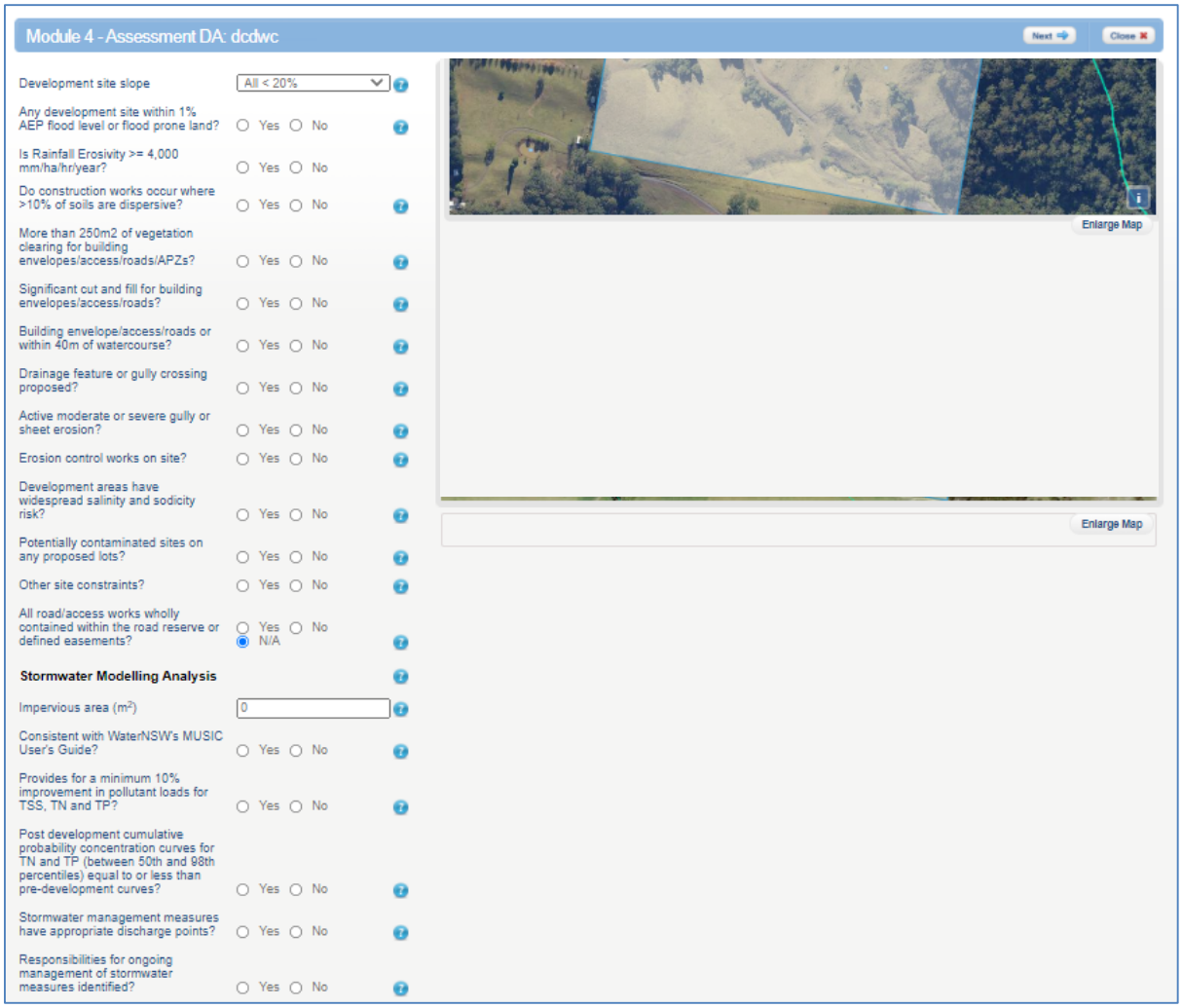
5.8. MODULE 4 ASSESSMENT

After completing the Pre-Assessment checklist, the NorBE Tool will automatically take you to the **Module 4** screen for development classes in that module. Module 4 developments are large rural subdivisions (4 lots or more) that are unsewered.

To complete a **Module 4** assessment, complete the following steps:

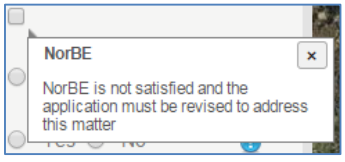
- Choose the Development site slope from the drop-down list.
- Select a radio button option (Yes or No or N/A) to each question, including whether the development site is within 1% AEP flood level or flood prone land.
- Select a radio button option (Yes or No or N/A) to each question within the Stormwater Modelling Analysis Section.

- You will be required to use stormwater quality modelling e.g. MUSIC software to assess stormwater impacts and management measures where the proposed impervious area is greater than 2,500 m^2 (refer to WaterNSW's 'Using MUSIC in Sydney's Drinking Water Catchment' guide for information on appropriate modelling



where the impervious area is less than 2,500 m^2).

- Ensure that you address any issues if the following dialog box appears:



- Once you've answered all Module 4 questions click **Next**. If necessary, this will take you to the wastewater effluent model (**WEM**) tab (see Section 6 for further detail on the WEM), or otherwise will take you to the **Outcome** tab (see Section 9 for further detail on the **Outcome** tab).
- Click the **Report** button to download an assessment report in PDF format in a separate window, which will provide all details entered for the assessment. This can be downloaded at any stage during the assessment. You can either save this electronically or print a hard copy.

The following are the main considerations when completing a Module 4 assessment:

- WaterNSW strongly discourages development on sites with slopes greater than 20%.

- The development must be consistent with WaterNSW's guide 'Using MUSIC in Sydney's Drinking Water Catchment'.
- Ensure you complete a site inspection before finalising the assessment to confirm the desk top assessment accurately reflects the site.
- If there are other site constraints NorBE will not be satisfied unless appropriate management measures have been proposed. Use site plans and aerial photography and confirm through a site inspection (see Section 7).
- The WEM will need to be used to ensure that all lots can appropriately manage on-site wastewater taking into consideration site constraints.
- A Module 4 assessment will **always** need to be referred by Council to WaterNSW for concurrence.

6. WASTEWATER EFFLUENT MODEL

One of the key features of the NorBE Tool is the wastewater effluent model (WEM).

The WEM models the predicted extent of an effluent plume from an on-site effluent disposal system and allows a visual interpretation and assessment of the potential impact of a development on water quality. Specifically, the WEM models the direction and distance that three contaminants (faecal coliforms, nitrogen, and phosphorus) will travel within the soil sub-surface beyond the edge of the effluent management area (EMA) to the point where contaminant concentrations reach a pre-determined threshold level. The resulting output is a plume with three colours displayed visually on the map.

The model is run over a 25-year period at 2.5 metre increments over a maximum distance of 250 metres. In addition, the model is a 'stochastic' model, which means that it is not run just once, but 100 times to enable the model outcomes to be reviewed in terms of confidence limits rather than absolute values. The outcome values (i.e. the plume distances you see visually displayed on the map) represent the 95th percentile.

The WEM also contains a front-end design component that ensures that effluent disposal areas meet the minimum area requirements of AS/NZS 1547:2012.

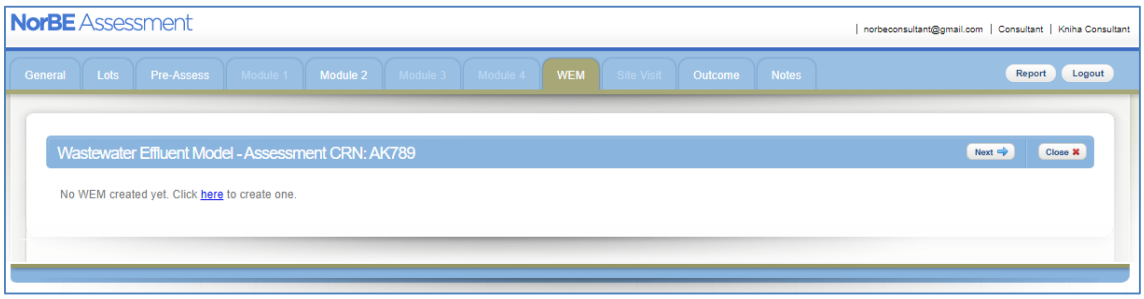
Site conditions and constraints will affect which on-site wastewater system and effluent disposal system will be appropriate. See tables in **Section 6.7** that outline the site limitations associated with on-site wastewater and effluent disposal systems to help you determine whether a system is appropriate for the specific site conditions. If an inappropriate system is selected for the site conditions, the Tool will notify the user of this and they cannot proceed with running a model. Discussions will need to take place with the proponent to consider a more suitable system or location. These tables should be referred to when considering the proposed development and when undertaking a site inspection to confirm site conditions and constraints.

6.1. CREATING A NEW WEM PLUME MODEL

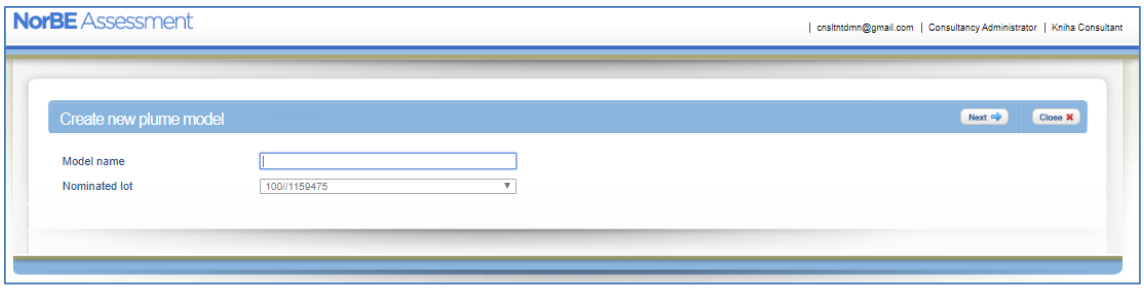
You will be required to create a WEM for most Module 2 and 4 assessments and the Tool will automatically take you to the **WEM** tab when this step is required.

To create a new WEM plume model when in the **WEM** tab:

- Click on here to create a new model.



- Enter a Model name or number in the free-text box.
- Choose the lot where the EMA will be placed from the drop-down box (if there is more than one lot in the DA).
- Click on the **Next** button.

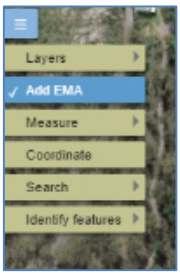


Also note that for rural subdivisions, more than one WEM will need to be created to ensure that on-site wastewater disposal can meet NorBE within each of the proposed lots (or groups of lots where the soils and site constraints are similar), and to identify where a restriction to the title may be required for on-site treatment and/or disposal system type or location of the system.

You will then be required to enter data into four screens that appear as tabs across the top of the screen.

6.2. GENERAL

The first screen is the **General** tab, which is the default screen for the model. This displays the **Model name**, any **Model description** you enter, the **Date saved** and the chosen lot over an aerial photo. It also allows you to locate the EMA. The process on locating the EMA and how to move an EMA is also explained on the screen.

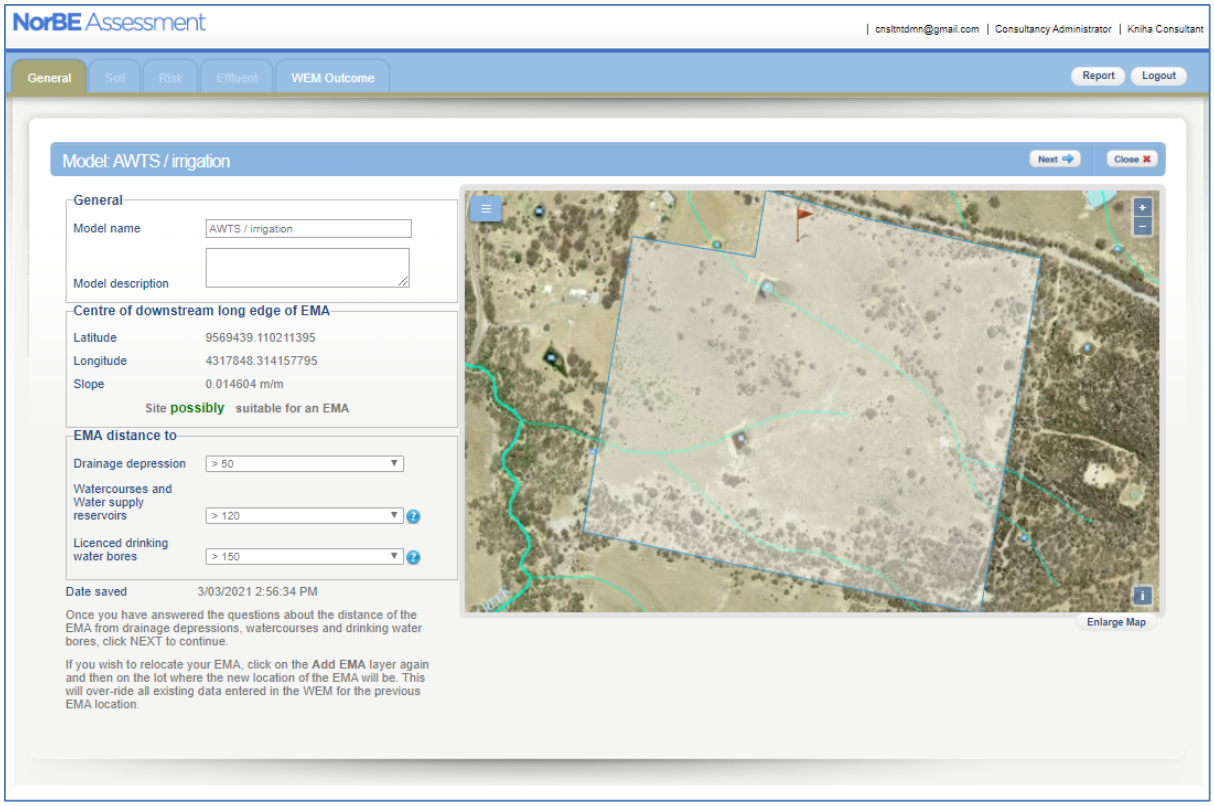


- To choose a site on the lot to place the EMA, click on the layers menu on the top left corner of the map, and select **Add EMA** (the layer box will turn blue and contain a tick to indicate it has been chosen), then click on the map in the proposed EMA location. Note: The location of the marker will represent the midpoint of the downslope edge of the EMA (i.e. the middle of the lowest boundary of the EMA).
- Once the EMA is located, GIS information for this specific location is called up and the **General** screen will expand to display this information, including slope, latitude and longitude from the GIS.

NOTE: If a slope value of greater than 20% is displayed, this will not be suitable for an EMA. While you can continue with the assessment in such instances, you will not be able to run the model unless you confirm, based on the site inspection, that the slope is in fact suitable for the chosen system (this will be located on the **WEM Outcome** Tab).

The Tool then requires you to choose the distance of the EMA to any drainage depressions, watercourses and groundwater bores from the drop-down boxes – use the distance measuring Tool in the Toolbar if you are unsure. The distance represents the overland flow path.

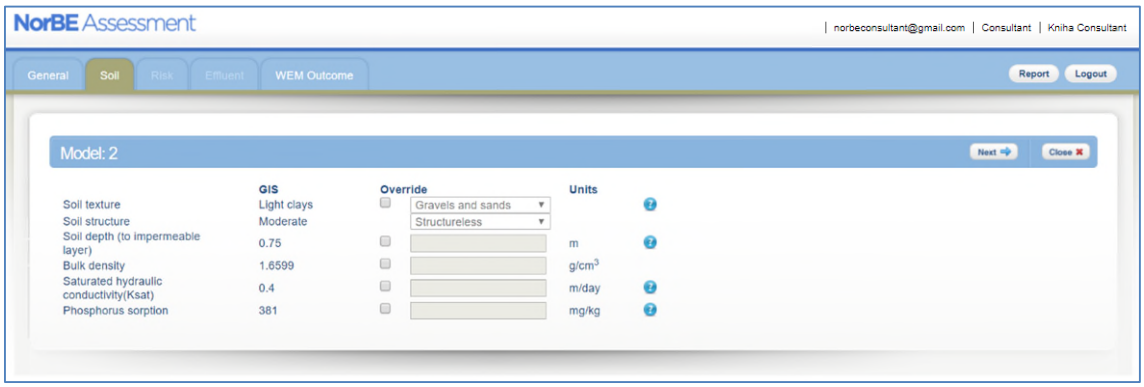
NOTE: If you select an 'EMA distance to' range below the minimum threshold for that feature, then the NorBE Tool WEM Outcome will be 'Not Satisfied' and you cannot run the WEM, and the NorBE Outcome will also be 'Not Satisfied' for this model if nominated as the final model considered in the assessment.



6.3. SOIL

Once you have located the EMA and completed the **General** screen, click the **Next** button and the NorBE Tool will take you to the **Soil** screen (the next 'tab' along). The **Soil** screen displays the characteristics of the soil at your chosen EMA location, derived from GIS values based on the soil facets layer developed by the former SCA and DLWC.

You can either use these values or override them if site specific information is available (included in the wastewater report) – tick the **Override** box and type in the value in the corresponding text box. If you do choose to override the GIS value, you will need to either choose a value from the drop-down box for soil texture and structure or enter a new value in the relevant box for the other characteristics.



NOTE: If you do change the **Soil texture** and **Soil Structure**, default values (that are indicative of a typical soil of this type) will automatically populate **Bulk Density**, **Saturated hydraulic conductivity** (Ksat) and **Phosphorus sorption** (Psorp). You can further override these values if you have site specific values for these by simply typing in new values in the

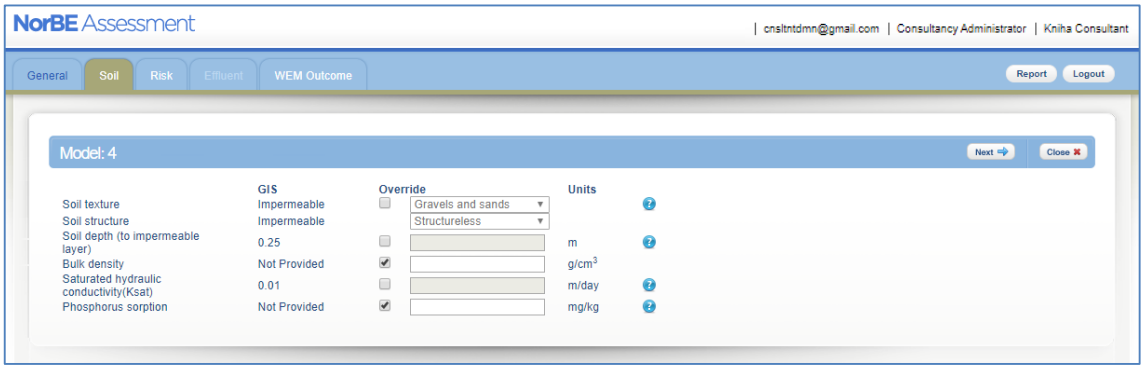
text box. Table 6.3.1 provides these default values for each soil type and texture. Soil depth will not automatically be over-ridden.

Table 6.3.1– Typical values for soils

Soil Category	Texture	Structure	Typical K_{sat} (m/day)	Typical Psorp* (mg/kg)	Bulk Density g/cm^3
1	Gravels and sands	Structureless	4.0	50	1.8
2a	Sandy loams	Weak	3.0	100	1.8
2b	Sandy loams	Massive	2.0	100	1.8
3a	Loams	High / moderate	1.5	200	1.5
3b	Loams	Weak / massive	1	200	1.5
4a	Clay loams	High / moderate	0.75	400	1.5
4b	Clay loams	Weak	0.4	400	1.5
4c	Clay loams	Massive	0.1	400	1.5
5a	Light clays	Strong	0.3	500	1.3
5b	Light clays	Moderate	0.1	500	1.3
5c	Light clays	Weak / massive	0.06	500	1.3
6a	Med-heavy clays	Strong	0.08	600	1.3
6b	Med-heavy clays	Moderate	0.06	600	1.3
6c	Med-heavy clays	Weak / massive	0.06	600	1.3

* If soil parent material is basalt then increase Psorp by 100 mg/kg

- WaterNSW prefers that site-specific soil values that have been determined during the site inspection and included in the wastewater report are used.
- There are some small areas in the catchment where the soils data is not available. In this case, the GIS value will be 'Not Provided' and the **Override** box will automatically be checked. You will be required to enter site specific information otherwise the WEM will fail and you will be asked to re-run the model after providing the information.

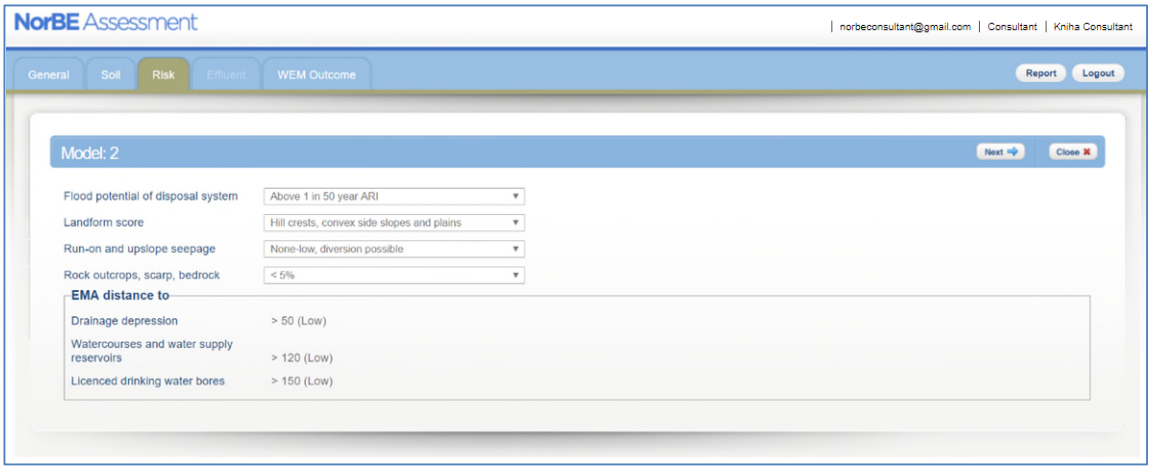


- Where **Soil depth** is less than 0.25 m, this is considered not suitable for the majority of effluent disposal systems, with the exception of mound systems. Therefore, it is important to closely examine soil values, in particular soil depth, to ensure this is adequate for the proposed system, and that this is confirmed during the site inspection where possible.

6.4. RISK

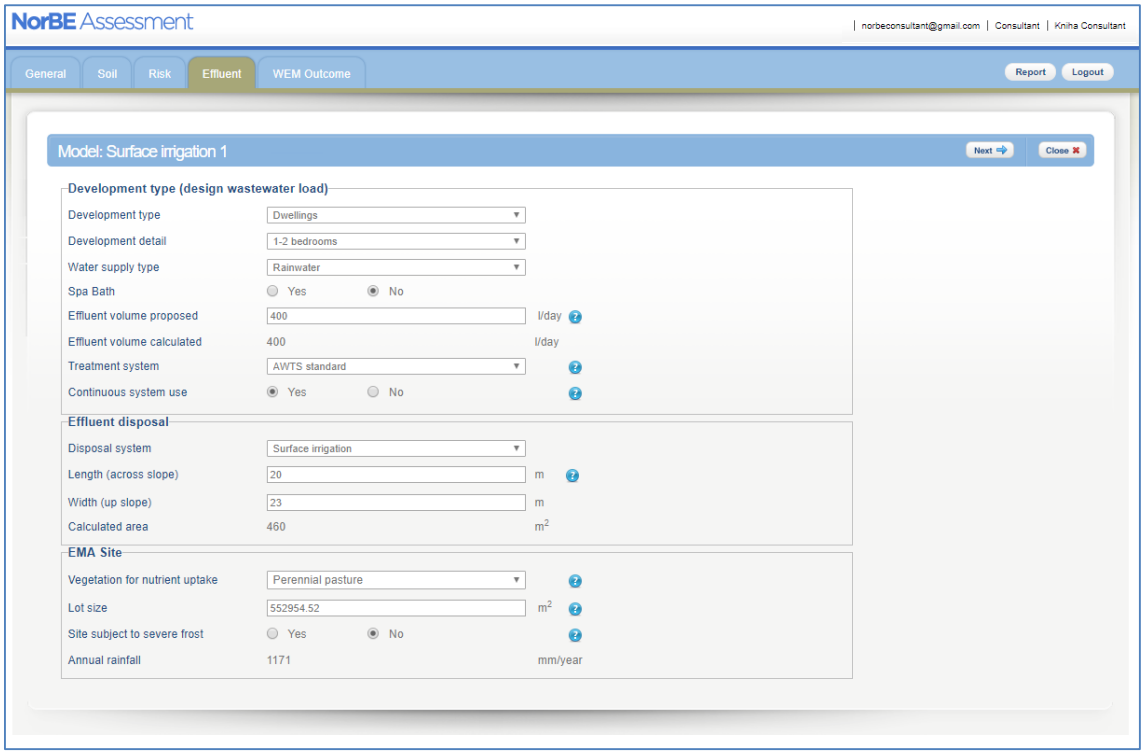
Once you have completed the **Soil** screen, click on the **Next** button. The NorBE Tool will take you to the **Risk** screen (the next 'tab' along) where you be required to enter further information from a number of drop-down lists. This information relates to **Flood potential of disposal systems**, **Landform score**, **Run-on and up-slope seepage** and **Rock outcropping,** and in combination with other factors, including soils properties and distance to watercourses, may cause the on-site wastewater system to operate in a failure mode. The NorBE application will

determine whether there is a low, moderate, or high risk of failure, and this will potentially affect the size and potentially direction of the effluent plume will be affected. The result of this failure mode risk assessment is displayed on the **WEM Outcome** screen.



6.5. EFFLUENT

Once you have completed the **Risk** screen, click on the **Next** button. The NorBE Tool will take you to the **Effluent** screen (the next 'tab' along).



On the **Effluent** screen, you need to enter information about:

- the development, including **Number of bedrooms** and **Water supply type** to calculate the design wastewater load. **NOTE:** while you will be asked to enter the proposed wastewater load, it is the calculated design wastewater load that will be used for modelling purposes, although both volumes will appear on the WEM report.
- the **Treatment system** (choose from a drop-down box)
- whether the system will be used continuously (defaulted to 'Yes')

- the **Effluent disposal system** (choose from a drop-down box that automatically corresponds to the treatment system selected) proposed size of the EMA and proposed number of trenches (where relevant)
- the EMA site **Vegetation for nutrient uptake**
- other site information such as whether the site is subject to severe frosts (defaulted to 'No').

NOTE: Lot size will be automatically displayed from the GIS, however if this comes up as zero or blank, you should manually enter the lot size – use 'Measure Area' from the layers list to measure the lot size.

It is important to note that the WEM will not run when the proposed EMA:

- is less than the minimum required EMA consistent with AS/NZS 1547:2012
- exceeds the practicable maximum EMA (see Table 6.5.1)
- a trench length exceeds the maximum allowable length of 20 metres.

Refer to Appendix 3 for further detail on sizing the EMA for irrigation and other systems.

Table 6.5.1 – Maximum Allowable EMA Areas

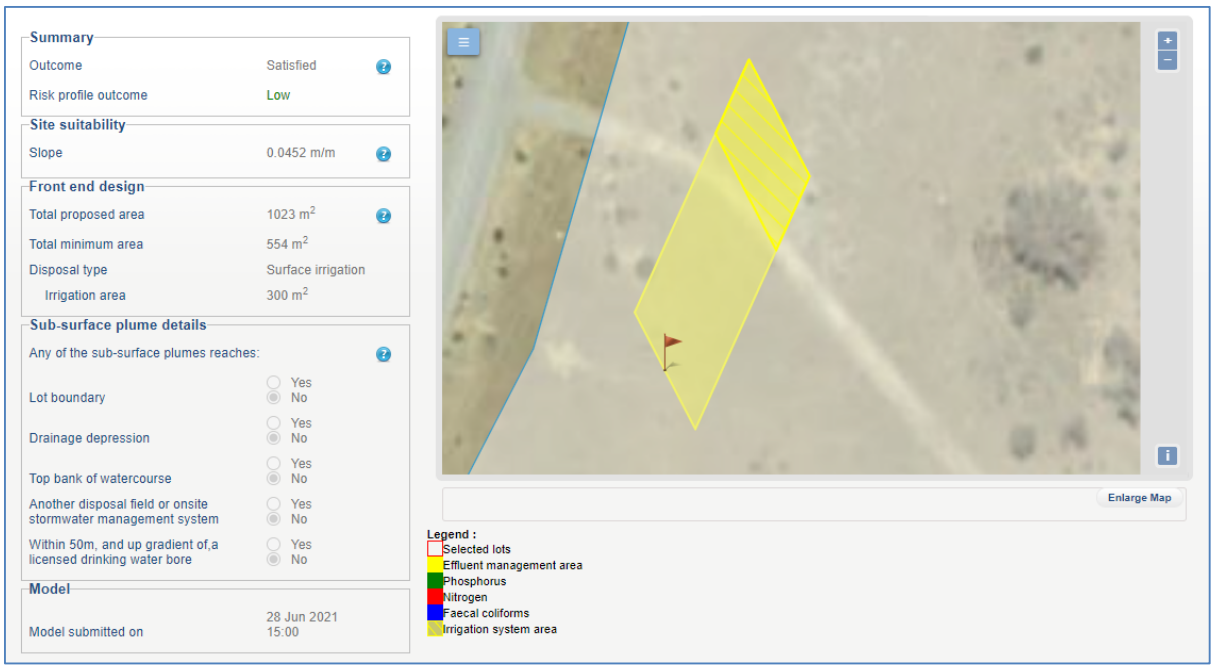
Disposal System Type	Maximum Allowable EMA Area (m^2)
Absorption trench	150
Absorption bed	200
ETA bed	250
Sand mound	250
Amended soil mound	250
Surface irrigation	1,500
Sub-surface irrigation	1,500

The NorBE Tool will generate a message notifying the user when the above situations occur and the user will be required to change the proposed area or system type, otherwise the WEM will not be allowed to run. This check is done immediately for the trench length, and for the minimum and maximum EMA requirements (upon clicking the **Next** button).

Once you have completed this screen, click on the **Next** button. The NorBE Tool will take you to the final **WEM Outcome** screen.

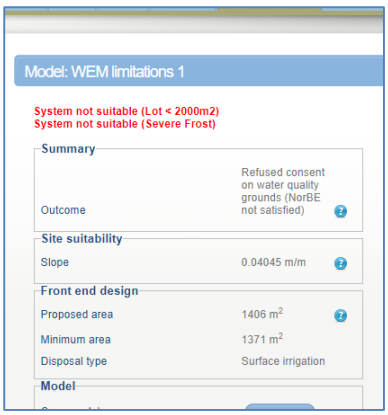
6.6. WEM OUTCOME

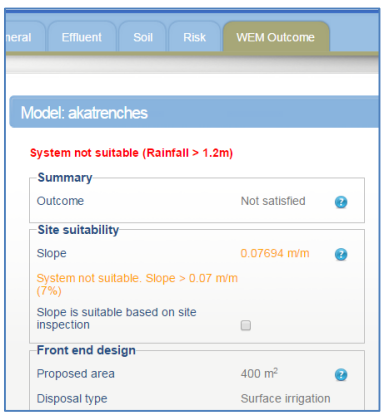
The **WEM Outcome** screen will display the EMA as proposed and will request the user to **Run** the model. **Note:** for irrigation disposal when the evaporation rate is greater than the rainfall, the EMA will include a 'hatched' area that represents the actual area that will need to be irrigated (the hydraulic area) plus an additional nutrient uptake area, as shown in the figure below. The screen will also display the size of the area that actually requires irrigation – in the figure below, the minimum size of the EMA is 554 m^2, however the Irrigation area is only 300 m^2. It is not necessary to irrigate an area greater than this, and in fact the system will not function properly if the irrigation hoses or pipes are spread over the larger area.



There will be some circumstances where the user cannot **Run** the model, including:

- the wastewater system is not compatible with various site constraints including soils, slope, lot size, rainfall, occurrence of severe frost, or intermittent use of the system and a WEM outcome of 'Not satisfied' is generated. **Note:** high rainfall restrictions are only relevant for surface irrigation
- where a slope is not compatible with the chosen system. The user can run a model if they confirm that the site slope is suitable based on a site inspection (a check box is provided in this case)
- where a disposal system requires more detailed design for the soil type. A message will be provided to remind the user of this requirement.





If the model runs and a plume greater than 250 m is generated, a message will appear stating this fact, and the plume will be displayed to the 250 m maximum. It is likely that NorBE will not be satisfied.

When the WEM is **Run**, it will take approximately five minutes, depending on whether there are other WEMs that may be waiting to run. The **WEM Outcome** screen now displays the date and the time the model was submitted to be **Run**.

You will receive an email notification once the model is run, providing details of the NorBE and WEM assessment name and number and a link to the assessment. You can then view the WEM output (the plume). You will also receive an email if a model fails.

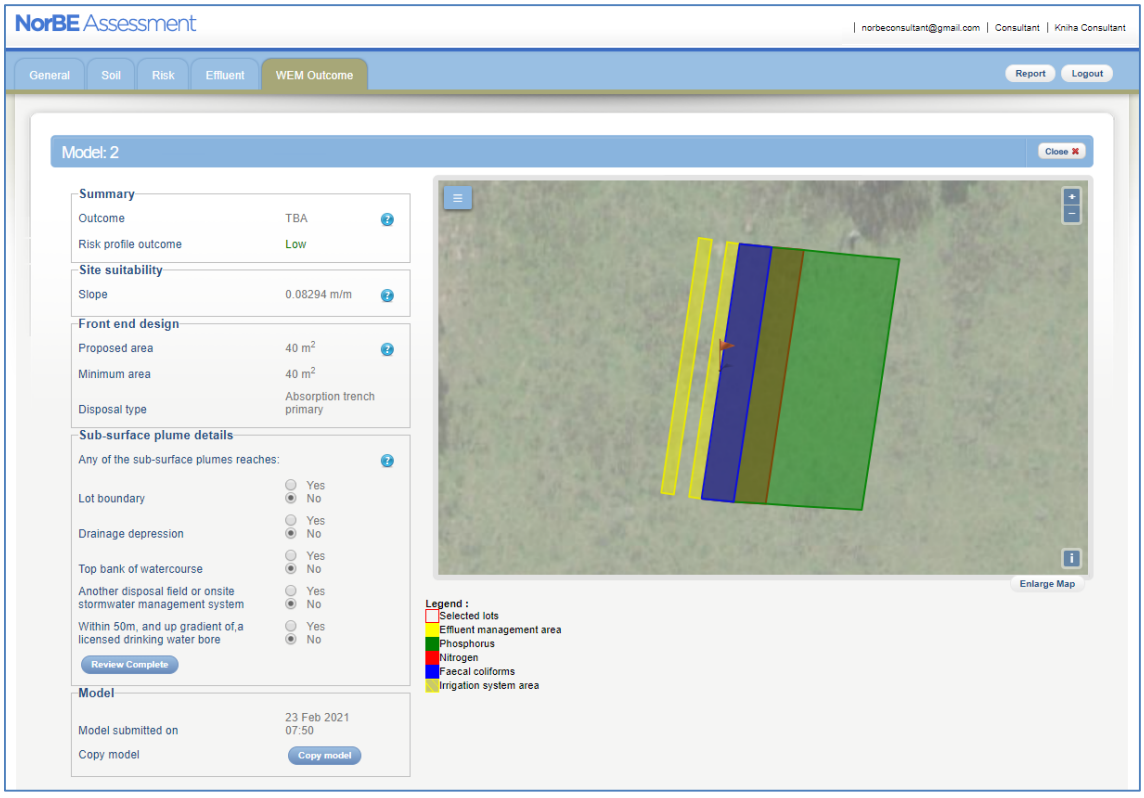
NOTE:

- While the model is running, the NorBE application can still be used to assess other proposals or to create and run new models.
- If you have not already closed the **WEM Outcome** screen prior to receiving the email notification, you will need to refresh your screen (press F5) to view the plume.
- If you do not have your email open and want to check whether the model has been completed, you can just refresh the screen or go to the **WEM** tab (a completed model will be indicated by a green tick).

Once the model has been run, you will then need to check whether the plume intersects a lot boundary or comes within relevant buffers to drainage depressions, watercourses, groundwater bores etc. A series of questions records this information, which will determine the WEM outcome and therefore whether NorBE is satisfied for wastewater or not. If the answer to *any* of the Review Questions is 'Yes', NorBE is **Not satisfied**.

You will need to click the **Review Complete** button after answering these questions, which will generate the final WEM Outcome and lock the WEM.

To help you complete the WEM Review, make sure you confirm the location of watercourses, drainage depressions and bores when completing your site inspection.



The **WEM Outcome** screen will display the WEM outcome, risk profile, initial slope, proposed and minimum area of the EMA, disposal system type, and the date the model was submitted. The user can also make a copy of the model from this page.

The EMA is displayed in the **WEM Outcome** screen as the area outlined in yellow with the flag. This represents the actual size of the proposed EMA. If system is trenches, each individual trench will be displayed. The plume is then displayed from the downslope edge of

the EMA. There are three plumes displayed (faecal coliforms, nitrogen and phosphorus), which are translucent and overlayed on top of one another. The legend is located under the map.

If you click on the **Report** button, you will download a WEM assessment report, in PDF format in a separate window, which provides all details entered for the model.

6.7. ONSITE WASTEWATER SYSTEM AND DISPOSAL SYSTEM SITE REQUIREMENTS

Consistent with the Standard AS/NZS 1547: 2012, limitations are placed on the use of certain effluent disposal systems – see Table 6.7.1 below.

Table 6.7.1 - General Limitations for Wastewater and Disposal Systems

System/Disposal Method	Limitations	Implications for design
Wastewater systems		
AWTS	• Intermittent loads	System not suitable
Effluent disposal system		
ETA	• Slope > 20% • Soil depth < 0.75 m	System not suitable System not suitable
Sand Mound	• Slope > 15%	System not suitable
Amended Soil Mound	• Slope > 7%	System not suitable
Absorption trenches	• Slope > 20% • Soil depth < 0.75 m	System not suitable System not suitable
Absorption beds	• Slope >20% • Soil depth <0.75 m	System not suitable System not suitable
Surface Irrigation	• Lot size < 2000 m^2 • Slope > 7% • Annual Rainfall > 1200 mm • Severe Frosts • Soil depth <0.25 m	System not suitable System not suitable System not suitable System not suitable System not suitable
Sub-surface irrigation	• Slope > 20% • Soil depth <0.25 m	System not suitable System not suitable

Note: where system is not suitable, a message will appear in the WEM to indicate this and the assessment cannot continue. On such occasions, a suitable design will need to be negotiated with the consultant/proponent, otherwise councils will need to refuse consent on water quality grounds and a note will need to be added to the NorBE assessment to that affect.

Table 6.7.2 below also lists on-site wastewater disposal system limitations associated with soil type consistent with the AS1547:2012.

Table 6.7.2 – Soil Type Limitations for Onsite Wastewater Disposal Systems

		Primary Effluent*1				Secondary Effluent*2						
Soil Texture	**Soil Structure**	**Trenches**	**Absorption Beds**	**ETA/ETS Beds**	**Subsurface Irrigation*3**	**Trenches**	**Absorption Beds**	**ETA/ETS Beds**	**Amended Soil Mound**	**Sand Mound**	**Subsurface Irrigation**	**Surface Irrigation**
Gravels & Sands	Structureless	✓	✓	✗	✗	✓	✓	✗	✓	✓	✓	✓
Sandy Loams	Weak	✓	✓	✗	✓	✓	✓	✗	✓	✓	✓	✓
Sandy Loams	Massive	✓	✓	✗	✓	✓	✓	✗	✓	✓	✓	✓
Loams	High/Moderate	✓	✓	✗	✓	✓	✓	✗	✓	✓	✓	✓
Loams	Weak/Massive	✓	✓	✗	✓	✓	✓	✗	✓	✓	✓	✓
Clay Loams	High/Moderate	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Clay Loams	Weak	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Clay Loams	Massive	✓	✓	✓	✓	✓	✓	✓	✓ plus SDR*4	✓ plus SDR*4	✓	✓
Light Clays	Strong	✓	✓	✓	✓ plus SDR*4	✓	✓	✓	✓	✓	✓	✓
Light Clays	Moderate	✓ plus SDR*4	✓ plus SDR*4	✗	✓ plus SDR*4	✓	✓	✓ plus SDR*4	✓ plus SDR*4	✓ plus SDR*4	✓	✓
Light Clays	Weak/Massive	✓ plus SDR*4	✓ plus SDR*4	✗	✓ plus SDR*4	✓	✓	✓ plus SDR*4	✓ plus SDR*4	✓ plus SDR*4	✓	✓
Med-heavy Clays	Strong	✗	✗	✗	✗	✗	✗	✓ plus SDR*4	✓ plus SDR*4	✓ plus SDR*4	✓	✓
Med-heavy Clays	Moderate	✗	✗	✗	✗	✗	✗	✓ plus SDR*4	✓ plus SDR*4	✓ plus SDR*4	✓	✓
Med-heavy Clays	Weak/Massive	✗	✗	✗	✗	✗	✗	✓ plus SDR*4	✓ plus SDR*4	✓ plus SDR*4	✓	✓

Notes

*1. Septic tank, Dry Composting Toilet, Wet Composting Toilet, Greywater Systems

*2. AWTS, Sand Filter

*3. For Wet Composting Systems ONLY. Disposal must be by Subsoil LPED Irrigation.

*4 SDR = Special design required. Special design criteria need to be applied, including soil modifications and soil permeability testing.

✓ Allowable system

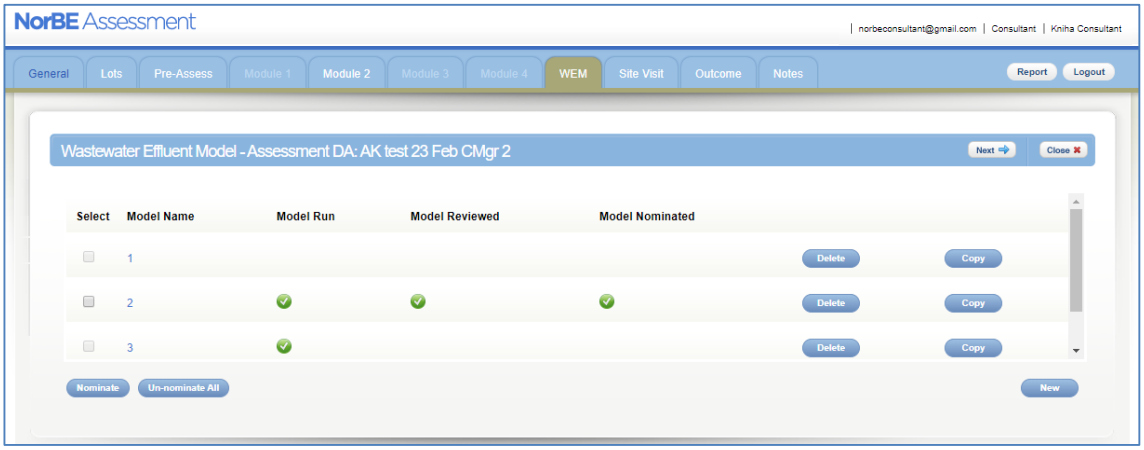
✗ System not preferred (not suitable / not possible) and therefore cannot be modelled in the WEM

6.8. WEM TAB/NOMINATE A WEM

The final stage of the WEM process is to nominate the WEM(s) you are going to use for your final NorBE outcome. The WEM tab lists all models that have been created and indicates where a model has been run, where a model has been reviewed and where a model has been nominated for the final assessment. On this page you can also copy or delete a model and create a new model.

- To nominate one or more models as final select those models using the checkbox.
- Click the Nominate button.

If you wish to un-nominate any model you must first un-nominate all models using the **Un-nominate All** button. You can then re-nominate the correct models for the assessment.



7. SITE VISIT

An essential component of the NorBE assessment is to undertake a site visit to confirm the accuracy of the desk top assessment and to identify any other site-specific information and constraints that may not have been evident in the application. *It is mandatory for consultants to undertake a site visit for all Module 2, Module 3 and Module 4 developments and it is highly recommended for Module 1 developments.*

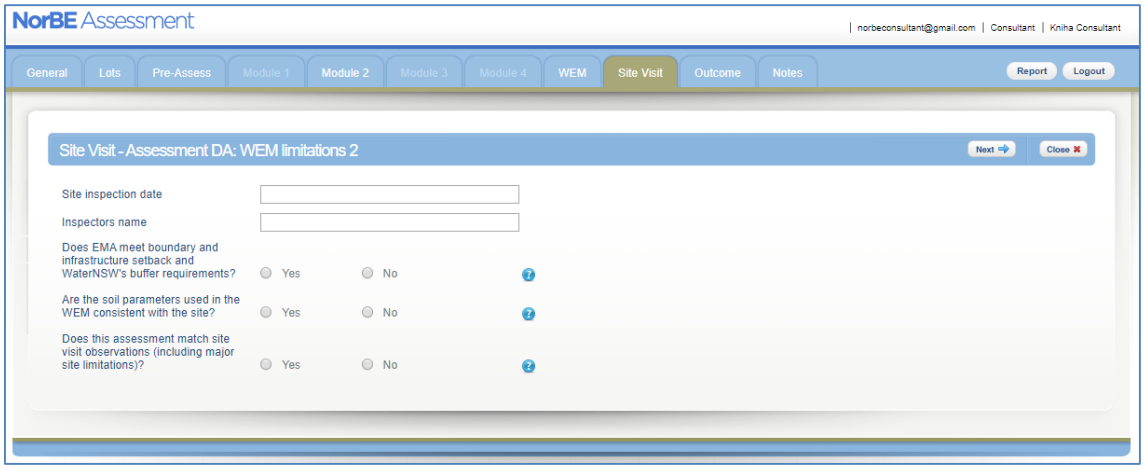
The site visit will be need to be recorded *before* completing the final **Review** of the model.

One of the last steps of the NorBE assessment will be completing the **Site Visit** tab by undertaking the following steps:

- Enter the relevant information, including date of the site visit and the inspector's name, both of which are compulsory.
- Confirm that the site visit matches the desk top assessment.

Also confirm whether:

- Lot boundary and infrastructure setback requirements are met.
- Soil in field /GIS is consistent with the wastewater report.

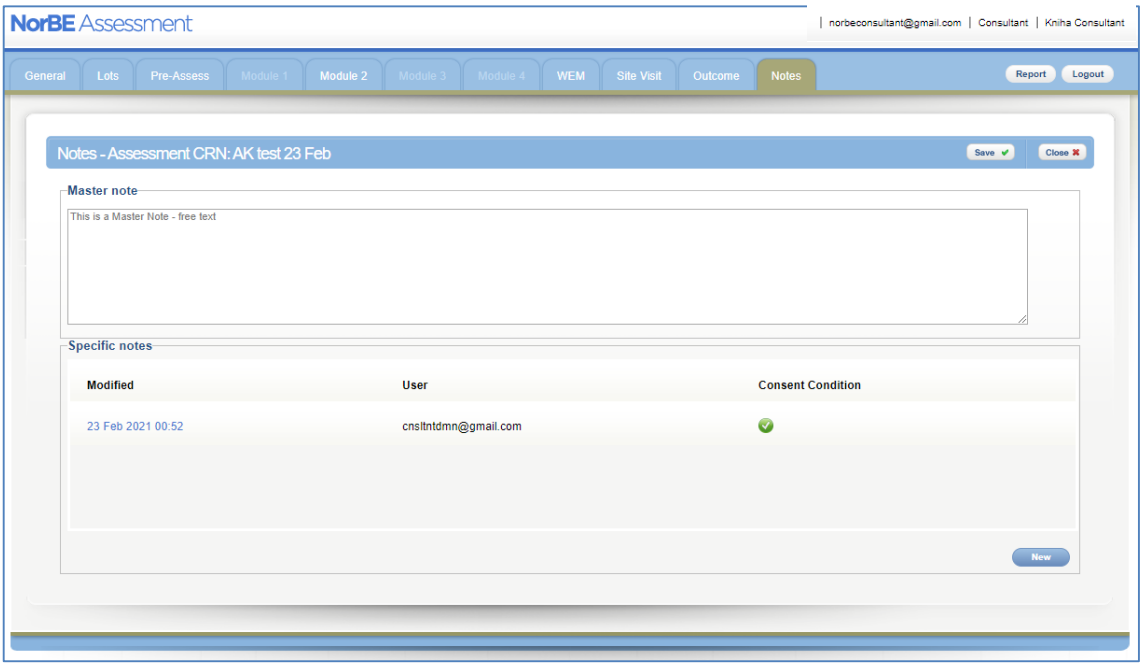


NOTE: If any other aspect of the desktop assessment does not match the site visit observations, then those aspects will need to be re-visited in the NorBE assessment otherwise the NorBE outcome will be set at 'Not Satisfied'.

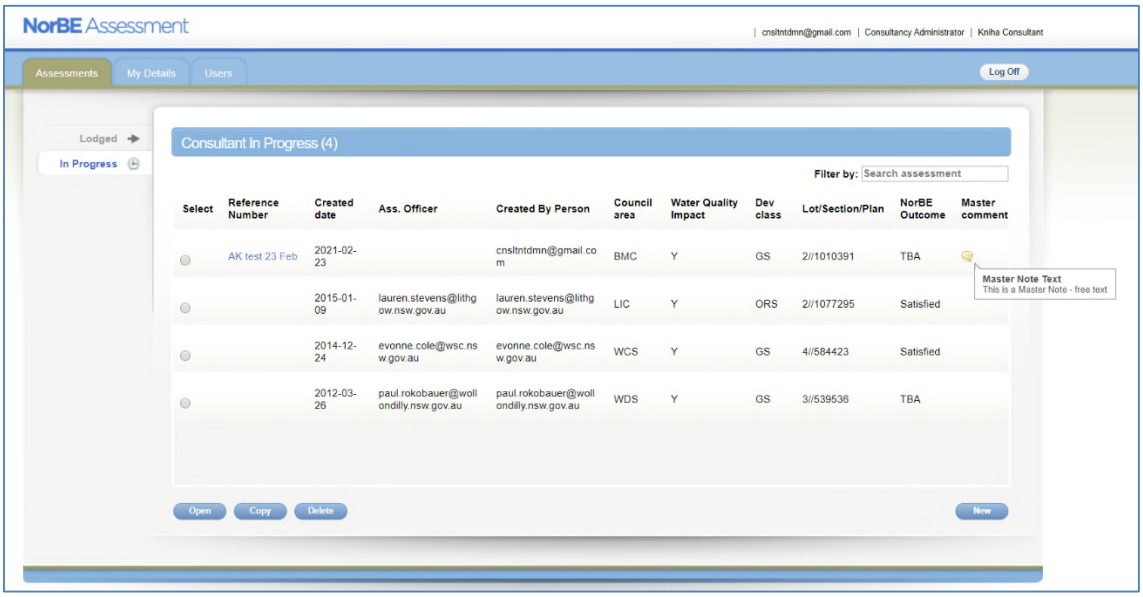
8. ADDING CONDITIONS AND NOTES

The NorBE Tool allows you to add in a **Master note** and **Specific notes** at any stage of the assessment until it has been submitted for approval. This can be done by clicking on the **Notes** tab along the top right-hand side of the Assessment Screen.

- A **Master note** can be added by typing the note in the free text box and then clicking on the **Save** button.
- To **Edit** or **Delete** a master note, change or delete the text in the text box and click the **Save** button again.



Master notes can be viewed from the Assessments Screen by hovering over the speech bubble next to a DA in the list.

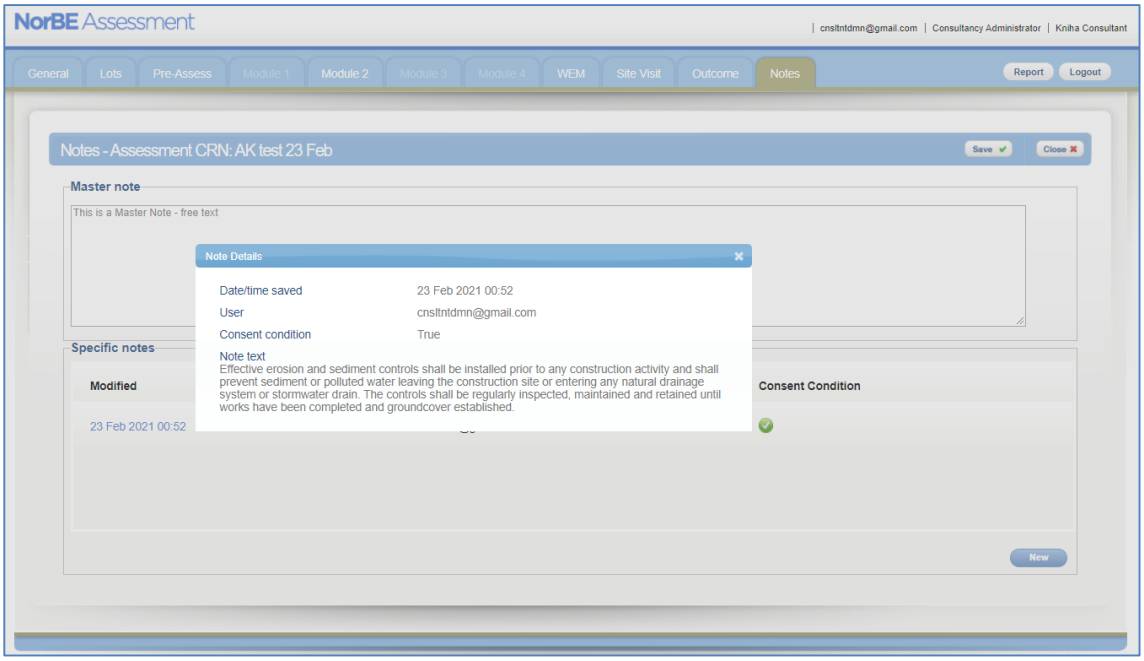


- A **Specific note** can be added by clicking the **New** button at the bottom right of the page. Enter the note into the text box that appears and click **Save**.
- To **Edit** a specific note, click on the note to open the text box, edit the text, and click on the **Save** button again.

- To **Delete** a specific note, click on the note to open the text box and then click the **Delete** button.

More than one **Specific note** can be added and will appear as a list in this section. It should be noted that **only** the user who created a note can edit or delete it.

The NorBE Tool also sets conditions automatically for matters not relating to on-site wastewater systems, depending on what information is entered into the assessment for the Module screens. These conditions are listed in the Specific notes section of the **Notes** screen with a green tick next to them. To view the text for a condition, click on the condition.

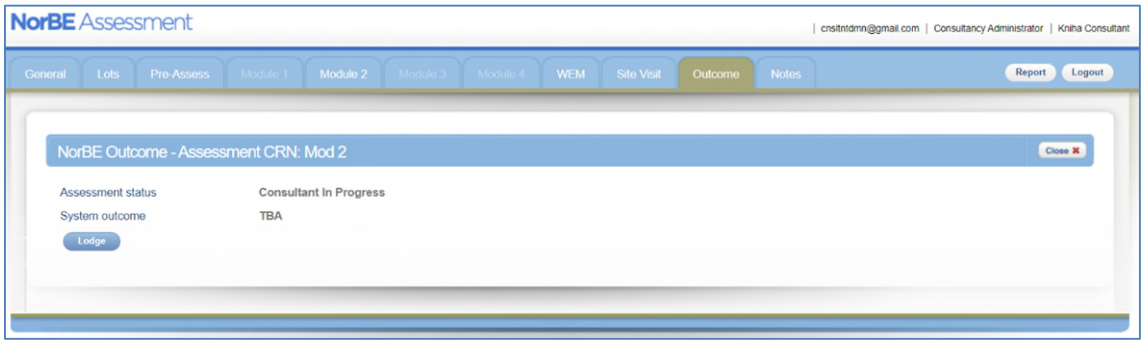


NOTE: Conditions are not automatically set within the WEM tabs due to the complex nature of the model. WaterNSW has conditions for each type of wastewater system and disposal field that have been provided to councils.

Both Notes and Conditions will be detailed in the NorBE Assessment Report (see Section 11).

9. NorBE OUTCOME

Once you have answered all relevant questions and completed a WEM and site visit (where appropriate) clicking the **Next** button will take you to the **Outcome** tab. The NorBE Tool will generate an outcome based on the information you entered during the assessment.



The **Outcome** tab will show the **Assessment status**, which will be either **Consultant In Progress** or **Lodged** once an assessment has been lodged.

A **System outcome** is automatically generated by the Tool and cannot be changed. The **System outcome** can either be **'TBA'** (to be advised), **Satisfied**, **Not Satisfied** or **WaterNSW concurrence required**.

Note: regardless of the **System outcome**, a Module 3 or 4 assessment must be referred to WaterNSW for concurrence.

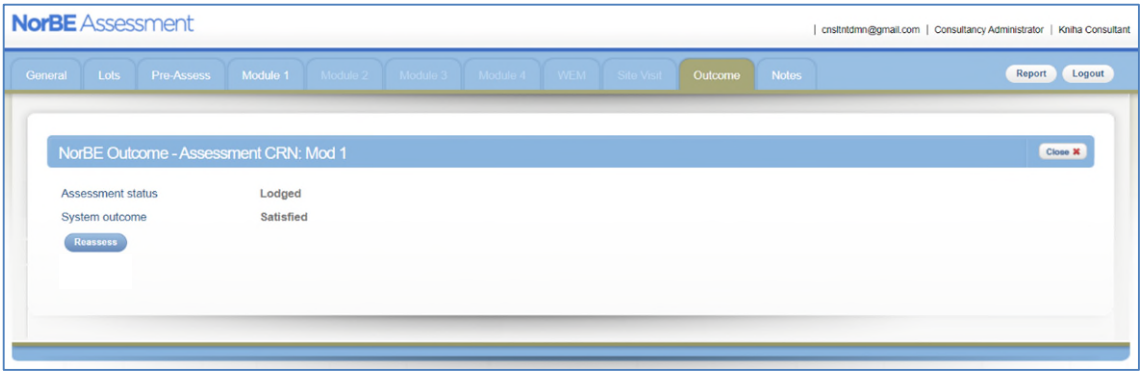
10. LODGING AN ASSESSMENT

When the assessment is finished and a **System outcome** has been generated, the assessment can be lodged to council by clicking the **Lodge** button. This will move your assessment to the **Lodged** screen on the **Assessments Page**. Once a council opens your lodged assessment, it will disappear from the **Lodged** screen and you will no longer be able to view it.

- To lodge an assessment, click the **Lodge** button.
- Once an assessment has been lodged it is possible to recall it for further assessment by clicking the **Reassess** button on the **Outcome** screen.

10.1. REASSESS

If the assessment requires reassessment once it has been lodged, and before the council has assigned a DA number and moved the assessment to their **In Progress** state, the consultant can use the **Reassess** button to send it back to the **In Progress** state.



10.2. REWORK

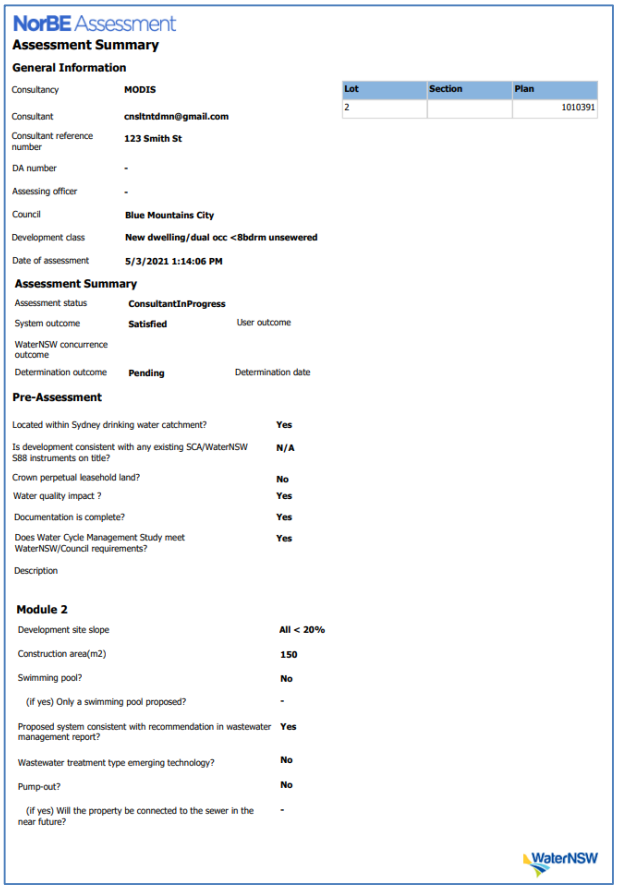
It is also possible for a council user to return a consultant's lodged assessment. You will receive an email if this happens and the assessment will appear back in your **In Progress** tab with a council **DA number** attached to it. A **Note** will have been attached to the assessment explaining why it has been returned for further assessment. This can be found in the **Notes** tab.

11. CREATING REPORTS

11.1. NorBE ASSESSMENT REPORT

When completing an assessment, it is possible at any stage of the assessment to download an assessment summary by clicking the **Report** button at the top right of the screen. The report opens in a new window and can be printed or saved electronically.

This report acts as a summary of everything that is entered into that specific assessment at the time the report is generated. It will include the details of all WEMs completed as well as the site inspection questions. An example of a report is shown below:



NorBE Assessment

Assessment Summary

General Information

Consultancy	**MODIS**
Consultant	**cnsltntdmn@gmail.com**
Consultant reference number	**123 Smith St**
DA number	-
Assessing officer	-
Council	**Blue Mountains City**
Development class	**New dwelling/dual occ <8bdrm unsewered**
Date of assessment	**5/3/2021 1:14:06 PM**

Lot	Section	Plan
2		1010391

Assessment Summary

Assessment status	**ConsultantInProgress**		
System outcome	**Satisfied**	User outcome	
WaterNSW concurrence outcome			
Determination outcome	**Pending**	Determination date	

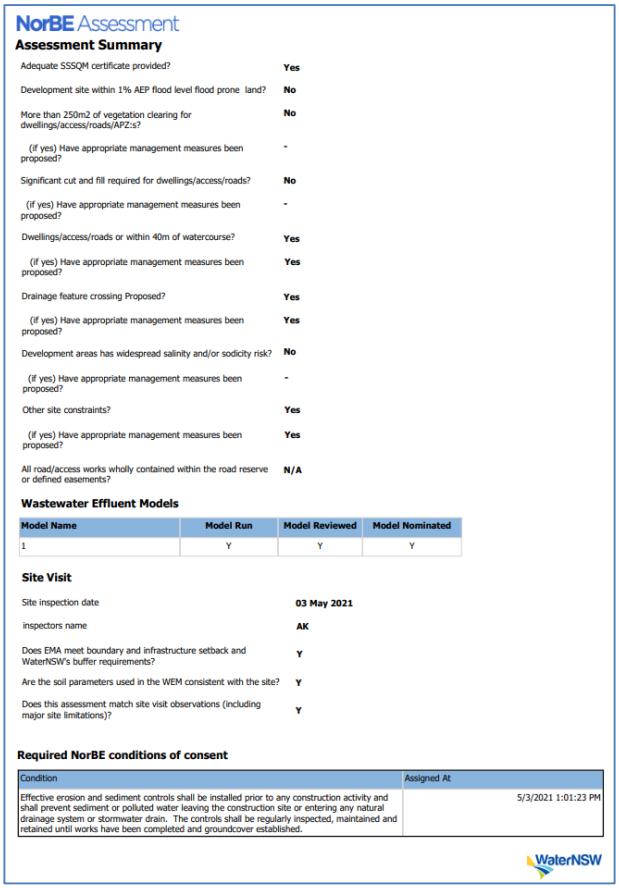
Pre-Assessment

Located within Sydney drinking water catchment?	**Yes**
Is development consistent with any existing SCA/WaterNSW S88 instruments on title?	**N/A**
Crown perpetual leasehold land?	**No**
Water quality impact ?	**Yes**
Documentation is complete?	**Yes**
Does Water Cycle Management Study meet WaterNSW/Council requirements?	**Yes**
Description	

Module 2

Development site slope	**All < 20%**
Construction area(m2)	**150**
Swimming pool?	**No**
(if yes) Only a swimming pool proposed?	-
Proposed system consistent with recommendation in wastewater management report?	**Yes**
Wastewater treatment type emerging technology?	**No**
Pump-out?	**No**
(if yes) Will the property be connected to the sewer in the near future?	-

WaterNSW



NorBE Assessment

Assessment Summary

Adequate SSSQM certificate provided?	**Yes**
Development site within 1% AEP flood level flood prone land?	**No**
More than 250m2 of vegetation clearing for dwellings/access/roads/APZ:s?	**No**
(if yes) Have appropriate management measures been proposed?	-
Significant cut and fill required for dwellings/access/roads?	**No**
(if yes) Have appropriate management measures been proposed?	-
Dwellings/access/roads or within 40m of watercourse?	**Yes**
(if yes) Have appropriate management measures been proposed?	**Yes**
Drainage feature crossing Proposed?	**Yes**
(if yes) Have appropriate management measures been proposed?	**Yes**
Development areas has widespread salinity and/or sodicity risk?	**No**
(if yes) Have appropriate management measures been proposed?	-
Other site constraints?	**Yes**
(if yes) Have appropriate management measures been proposed?	**Yes**
All road/access works wholly contained within the road reserve or defined easements?	**N/A**

Wastewater Effluent Models

Model Name	Model Run	Model Reviewed	Model Nominated
1	Y	Y	Y

Site Visit

Site inspection date	**03 May 2021**
inspectors name	**AK**
Does EMA meet boundary and infrastructure setback and WaterNSW's buffer requirements?	**Y**
Are the soil parameters used in the WEM consistent with the site?	**Y**
Does this assessment match site visit observations (including major site limitations)?	**Y**

Required NorBE conditions of consent

Condition	Assigned At
Effective erosion and sediment controls shall be installed prior to any construction activity and shall prevent sediment or polluted water leaving the construction site or entering any natural drainage system or stormwater drain. The controls shall be regularly inspected, maintained and retained until works have been completed and groundcover established.	5/3/2021 1:01:23 PM

WaterNSW

11.2. WEM REPORT

It is possible to download a WEM summary report at any stage during the WEM by clicking the **Report** button at the top right of the screen, when you are in the WEM. The report opens in a new window and can be printed or saved electronically.

This report acts as a summary of everything that is entered into that specific WEM at the time the report is generated and can be included in the council Development Application assessment. The report also includes a map of the WEM outcome plume and all the relevant lot(s). An example of a WEM Report is shown below:

NorBE Assessment

WEM Summary

version 3

General Information

WEM model ID	**2281289**	Associated DA number	
Model description			
Consultancy	**MODIS**	Consultant	**cnsltntdmn@gmail.com**
Consultant reference number	**123 Smith St**		
Council	**Blue Mountains City**	Assessing officer	
Nominated lot	**2//1010391**	Associated lots	
Development class	**New dwelling/dual occ <8bdrm unsewered**		
Date of model run	**5/3/2021 1:11:53 PM**		

Lot	Section	Plan
2		1010391

WEM Model Run Summary

Model run outcome **Satisfied**

Any of the sub-surface plumes reaches:

Lot boundary	**No**
Drainage depression	**No**
Top bank of watercourse	**No**
Another disposal field or onsite stormwater management system	**No**
Within 50m, and up gradient of,a licensed drinking water bore	**No**

Proposed Front End Design

Length (across slope)(m)	**26.0**	Width (up slope)(m)	**26.0**
Proposed area(m2)	**676.0**	Minimum Required area (m2)	**664.0**
Number of trenches	**0**		
Effluent volume proposed (l/day)	**600**		
Effluent volume calculated (l/day)	**600**		

WEM Model Inputs

Location

Easting	**9626979.304579**	Northing	**4344206.573242**
Slope (m/m)	**0.06854**	Slope is suitable based on site inspection (Applicable to some disposal systems on steep slopes)	**N/A**

Development

Development type	**Dwellings**	Development detail	**3 bedrooms**

WaterNSW

NorBE Assessment

WEM Summary

version 3

Water supply type	**Rainwater**	Spa Bath	**No**
Continuous system use	**Yes**		
Treatment system	**AWTS standard**	Disposal system	**Irrigation surface**

Site

Lot size(m2)	**552955**		
Subject to severe frost	**No**	Bulk density(g/cm3)	**1.38**
Vegetation for nutrient uptake	**Perennial pasture**	Phosphorus sorption (mg/kg)	**609**
Soil depth (to impermeable layer) (m)	**0.30**	Soil structure	**Strong**
Saturated hydraulic conductivity (Ksat)(m/day)	**0.30**		
Soil texture	**Med-heavy clays**		

Effluent disposal risk factors

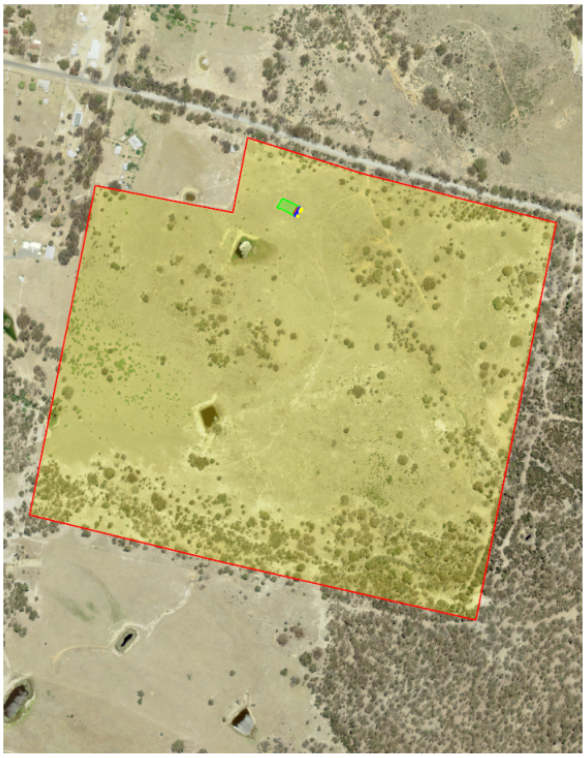
Depth to water table	**< 0.4**
Flood potential of disposal system	**Above 1 in 50 year ARI**
Landform score	**Hill crests, convex side slopes and plains**
Run-on and upslope seepage	**None-low, diversion possible**
Rock outcrops, scarp and bedrock	**< 5%**
Distance to drainage dpression	**> 50**
Distance to watercourses and water supply reservoirs	**> 120**
Distance to licenced drinking water bores	**> 150**

NorBE Assessment

WEM Summary

version 3

WEM Plume Map



WaterNSW

12. CONTACT DETAILS

- For technical help with the Tool email Environmental.Assessments@waternsw.com.au.
- For general enquiries regarding NorBE assessments for DAs contact a member of the WaterNSW's Catchment Protection team on 1300 662 077.

APPENDIX 1 – ACRONYMS

AEP	Annual exceedance probability
DA	Development application
DLWC	(former) Department of Land and Water Conservation
EMA	Effluent management area
GIS	Geographical information systems
Ksat	Saturated hydraulic conductivity or soil permeability
NorBE	Neutral or beneficial effect (on water quality)
Psorp	Phosphorus sorption
SEPP	State Environmental Planning Policy (Biodiversity and Conservation) 2021
WCMS	Water cycle management study
WEM	Wastewater effluent model

APPENDIX 2 – DEVELOPMENT CLASSES

Description	Development Class	Module Grouping
Existing dwelling / dual occupancy sewered[1]	B	1
New dwelling / dual occupancy sewered[1]	C	1
Farm building/shed without on-site wastewater proposal[2]	D	1
Farm building/shed with on-site wastewater proposal[2]	Du	2
Bed and breakfast sewered	E	1
Bed and breakfast unsewered	I	2
Swimming pool / spa pools only, sewered area[3]	Fs	1
Swimming pool / spa pools only, unsewered area[3]	F_U	2
Existing dwelling / dual occupancy < 8 bedrooms unsewered[1,4]	G	2
New dwelling / dual occupancy < 8 bedrooms unsewered[4,8]	Gs	2
Existing/new dwelling/dual occupancy ≥ 8 bedrooms unsewered[4]	G_L	5
Greywater systems in unsewered areas only	K	2
≤3 multi-dwelling housing, sewered	L_{S1}	1
≥4 multi-dwelling housing, sewered	L_{S3}	3
Multi-dwelling housing, unsewered	L_U	5
Subdivision, sewered <4 lots	M_{S1}	1
Subdivision, sewered ≥4 lots	M_{S3}	3
Subdivision, unsewered <4 lots	N_{US}	2
Subdivision, unsewered ≥4 lots	N_{UL}	4
Industrial	O_I	5
Retail premises/office premises, sewered[5]	O_{RS}	1
Retail premises/office premises, unsewered[5]	O_{RU}	2
Tourist / recreation / religious / education establishment or facility	P	5
Intensive livestock	Q	5
Intensive plant growing[6]	R	5
Designated development	S	5
Other development – e.g. offensive or hazardous industry or storage establishment development, service stations	T	5
Earthworks / farm dams <2,500 m^2 total disturbed area	U_s	1
Earthworks / farm dams ≥2,500 m^2 total disturbed area	U_l	5
Car parks[7] <2,500 m^2	V_S	1
Car parks[7] >2,500 m^2	V_L	5
Demolitions <2,500 m^2	W_S	1
Demolitions >2,500 m^2	W_L	5
Sewerage systems that have an intended processing capacity of more than 10 persons equivalent	Y	5
Temporary events	ZT	5
Other development[8]	ZO	5

Notes:

1. Where an attached dwelling is proposed, as defined under the SLEP, and the maximum number of dwellings is three it can be included as development class B or C for sewered areas or development class G for unsewered areas.
2. Farm buildings, as defined in the standard local environmental plan (SLEP), in both sewered and unsewered areas, and sheds in sewered areas, can be included in Development Class D (sewered) or D_U (unsewered).
3. Emptying spa baths can flush out on-site wastewater treatment systems and substantially deteriorate treatment performance. A wastewater surge tank should be installed for these systems.
4. Replacement of an on-site wastewater treatment system or disposal system is to be assessed under development classes G, G_s or G_L.
5. Retail referred to in Development Class O_{RS} and O_{RU} includes the development types of retail premises and offices premises or change of existing buildings as defined in the SLEP.
6. For example, orchards and vineyards require buffers of 20 metres to watercourses and water supply reservoirs, and 10 metres to drainage depressions.
7. Covering an unsealed car park in bitumen is construction. If the proposal involves using bitumen in a car park of area more than 2,500 m^2, it must be referred to WaterNSW for concurrence. All car parks, sealed or not, are considered to be impervious for assessment purposes.
8. However, vacant lots that have an existing dwelling entitlement (e.g. in an unsewered village) should be assessed under Module 5 (i.e. sent to WaterNSW for concurrence).

APPENDIX 3 – SIZING THE EFFLUENT MANAGEMENT AREA

The WEM requires the EMA to be sized consistent with WaterNSW requirements for minimum area, which incorporates methods described in AS/NZS 1547:2012. These requirements have been incorporated into the WEM. The following equations and values are used in the WEM to automatically calculate the minimum area.

Note: The WEM uses the proposed EMA to run the model, not the calculated minimum area. However, where the proposed EMA is smaller than the calculated minimum area, the WEM will not run, and a message will be displayed stating that the proposed EMA must be equal to or greater than the minimum area.

For Non-irrigation Systems:

The minimum area is calculated using hydraulic sizing only.

The hydraulic sizing is calculated using the following equation:

$$A_D = \frac{Q}{DLR}$$

where:

A_D = total minimum effluent management area (m^2)

Q = daily hydraulic flow from on-site wastewater treatment system (L/d)

DLR = design hydraulic loading rate to soil (mm/d or $L/m^2/d$)

DLR is a value that varies primarily with soil type, quality of effluent being applied and the disposal method. Values for DLR are provided in Table A1.

For Irrigation Systems:

The minimum area is calculated using the hydraulic sizing and nutrient sizing (for both nitrogen and phosphorus). The minimum area is taken to be the largest minimum area of the three areas calculated individually for the required hydraulic sizing, nitrogen sizing and phosphorus sizing.

Consistent with the sizing for non-irrigation systems, the hydraulic sizing for irrigation systems is calculated using the following equation:

$$A_D = \frac{Q}{DLR}$$

where:

A_D = total minimum effluent management area (m^2)

Q = daily hydraulic flow from the on-site wastewater treatment system (L/d)

DLR = design hydraulic loading rate to soil (mm/d or $L/m^2/d$)

Values for DLR are provided in Table A1.

The minimum area is also calculated on the basis of an annual nutrient application budget and soil sorption processes.

The nutrient sizing (for both phosphorus and nitrogen) is calculated using the following equation, specifically developed for the WEM:

$$A_D = \frac{3.65 c_x Q}{U_R + 0.2d(1-n_p)G_s X_{sorption}}$$

where:

A_D = total minimum effluent management area (m^2)

C_X = nutrient concentration from on-site wastewater treatment system (mg/L)

Q = daily hydraulic flow from onsite wastewater treatment system (L/d)

U_R = plant nutrient uptake rate (kg/ha/year)

d = design soil depth (m)

n_p = soil porosity

G_S = soil specific gravity (typically 2.65 g/cm^3)

$X_{sorption}$ = nutrient sorption with soil (mg/kg)

Values for plant nutrient uptake rate (U_R) are provided in Table A2.

Values for nutrient concentration from on-site wastewater treatment system (C_X) are provided in Table A3.

Soil porosity (n_p) can also be calculated as (1- soil bulk density/soil specific gravity)

Note: in the case of nitrogen, Xsorption is assumed to be 0, therefore the equation becomes:

$$A_D = \frac{3.65 c_x Q}{U_R}$$

Table A1 – Design Loading Rates for Hydraulic Loading Sizing

		Primary Effluent				Secondary Effluent						
Soil Texture	**Soil Structure**	**Trenches**	**Absorption Beds**	**ETA Beds**	**Subsurface Irrigation[1]**	**Trenches**	**Absorption Beds**	**ETA/ETS Beds**	**Amended Soil Mound**	**Sand Mound**	**Subsurface Irrigation**	**Surface Irrigation**
Gravels & Sands	Structureless	20	20	NP	NS	50	50	NP	32	32	5	5
Sandy Loams	Weak	20	20	NP	4	50	50	NP	24	24	5	5
Sandy Loams	Massive	15	15	NP	4	50	50	NP	24	24	5	5
Loams	High/Moderate	15	15	NP	3.5	50	50	NP	24	24	4	4
Loams	Weak/Massive	10	10	NP	3.5	30	30	NP	16	16	4	4
Clay Loams	High/Moderate	10	10	12	3	30	30	12	16	16	3.5	3.5
Clay Loams	Weak	6	6	8	3	20	20	8	8	8	3.5	3.5
Clay Loams	Massive	4	4	5	3	10	10	5	5 plus SDR	5 plus SDR	3.5	3.5
Light Clays	Strong	5	5	8	2.5 plus SDR	12	12	8	8	8	3	3
Light Clays	Moderate	5 plus SDR	5 plus SDR	NS	2.5 plus SDR	10	10	5 plus SDR	5 plus SDR	5 plus SDR	3	3
Light Clays	Weak/Massive	5 plus SDR	5 plus SDR	NS	2.5 plus SDR	8	8	5 plus SDR	5 plus SDR	5 plus SDR	3	3
Med-heavy Clays	Strong	NS	NS	NS	NS	NS	NS	5 plus SDR	5 plus SDR	5 plus SDR	2	2
Med-heavy Clays	Moderate	NS	NS	NS	NS	NS	NS	5 plus SDR	5 plus SDR	5 plus SDR	2	2
Med-heavy Clays	Weak/Massive	NS	NS	NS	NS	NS	NS	5 plus SDR	5 plus SDR	5 plus SDR	2	2

1 – For Wet composting systems ONLY. Disposal must be by Subsoil LPED Irrigation.
SDR – Special Design Required
NS – Not Suitable NP – Not Possible

Table A2 – Plant Nutrient Uptake Rates for Effluent Disposal

Crop	Total Nitrogen (kg/ha/year)	Total Phosphorus (kg/ha/year)
Good quality woodland	90	25
Poor quality woodland	65	20
Lawn – fully managed (clippings removed)	240	30
Lawn – unmanaged	120	12
Improved pasture	280	24
Perennial pasture	99	11
Shrubs and some trees – fully managed	150	16
Shrubs and some trees - unmanaged	75	8

Table A3 – On-site Wastewater Treatment System Effluent Quality

Treatment System	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)	Faecal Coliforms (CFU/100mL)
Septic Tank	160	21	1.0E+07
Dry composting toilet	6000	1500	1.0E+05
Wet composting toilet	35	10	5.0E+03
Sand filter – single pass (includes septic tank pre-treatment)	35	10	5.0E+03
Sand filter – recirculating (includes septic tank pre-treatment)	25	10	5.0E+03
Amended soil mound (includes septic tank pre-treatment)	15	1	1.0E+03
AWTS – Standard	30	12	1.0E+02
Sand Mound (includes septic tank pre-treatment)	35	10	5.0E+03
Greywater systems	10	20	5.0E+02