

NASM Plan Site Assessment



Purpose

The purpose of this document is to improve the quality of Field Sketch submissions and to ensure that the requirements of O. Reg 267/03 and the Nutrient Management Protocol are met in a consistent manner.

The information contained in this document is not authoritative. It is derived from the Nutrient Management Act, 2002 (NMA) and its General Regulation (O. Reg. 267/03) and is for informational purposes only. Efforts have been made to make it as accurate as possible, but in the event of a conflict, inconsistency or error, the requirements set out in the NMA, the Regulation and Protocols take precedence. Please refer to e-Laws for what the NMA and the regulation provide. In addition, there may be additional legal obligations under different pieces of Legislation which are not the subject of this training.

Contents

Step 1: Pre-site Assessment Preparation.....	2
Pre-Site Assessment Preparation	2
Pre-site Assessment Checklist	2
Step 2: Conducting an On-Site Assessment	5
Guide for On-Site Assessment.....	5
On-site Assessment Checklist.....	6
Step 3: Completing the Field Sketch.....	9
Appendix A: Examples of Online Information Sources for Pre-Site Assessment Preparation	11
Appendix B: Examples of Methods and Tools for Measuring Distances	14
Appendix C: Examples of Information Sources and Tools for Calculating Slope.....	16

Step 1: Pre-site Assessment Preparation

Pre-Site Assessment Preparation



It is helpful to prepare a plan for the Site Assessment by gathering information about the site before going out.

1. Information may be collected from several sources including:
 - previous approvals
 - online mapping tools
 - Soil Survey Reports/Maps
 - interviews with the site owner or adjacent land owners
2. The “NASM Plan Field Sketch Checklist” (available at nutrientmanagement.ca) can be used to guide you in your search for information. You can use this as a planning tool for your on-site assessment, eg. make notes of questions to ask property owners/operators.
3. Review of these sources of information should be used as an indicator of the probable presence or absence of site features.

The purpose of conducting an assessment on site is to confirm the information gathered in your preparation step and to check for additional site features that may not be apparent until you visit the site.

Pre-site Assessment Checklist



Previous Approvals

- a review of any previous NASM Plan approvals or previous Ministry of the Environment and Climate Change Certificates of Approval may be a source of information about features present on the site.
- previous approval documents may be available from the land owner/farmer or already be a part of your business files.

- review any previous approvals for a Field Sketch or map that shows the locations of sensitive features, land use, slopes and setbacks.

Do not rely solely on previous documents as the site features may have changed since the last approval.

An on-site assessment must be completed to verify the information.



Discussion with farmers and landowners

- these people can be very good sources of information such as where wells are located (currently in use and not being used), presence of tile drains, areas that tend to pond, etc.
- use the “NASM Plan Field Sketch Checklist as a guide to asking questions.
- record the answers, including the presence/absence of features so that they can be documented on the Field Sketch



Soil Survey Reports and Maps

- hardcopy soil maps and survey reports are available at a County level for most areas in Southern Ontario.
- these soil maps may provide detailed information on soil texture, drainage, depth to bedrock and topography (slope class).
- where depth to bedrock is indicated as shallow, small test pits should be dug on site to verify the depth to bedrock



Online Mapping Tools

- several mapping tools are available that provide local or province-wide information

Information found on these mapping sites should be viewed as an indication of what features may or may not be present on the site.

- Agricultural Information Atlas (ontario.ca/agmaps) and MOECC’s Map Well Records (ontario.ca/environment-and-energy/map-well-records) are both Ontario mapping sites that can provide useful information.

Site Assessment

- Source Water Protection Maps
(applications.ene.gov.on.ca/swp/en/)
- Many municipalities and conservation authorities have online mapping sites.
- Google Maps is a popular mapping tool that can provide relevant information and aerial imagery for most sites.

An on-site assessment must be completed to verify the information.

On any of these mapping sites, it is important to understand the metadata (data about the data). Metadata is usually included on each mapping site and can provide some context to the reliability of the information or features on the map. For example, well records may only include wells constructed in the last 40 years. Any wells constructed before that time may not show up in a well record search. Likewise, sites that use aerial imagery may have obtained the imagery over a span of several years. Older imagery may not show features such as residences or land use that have been constructed since the images were taken.

See Appendix A: Examples of Online Information Sources for Pre-Site Assessment Preparation.

Step 2: Conducting an On-Site Assessment



The on-site assessment confirms and/or supplements information gathered from other sources during the Pre-Site Assessment Preparation.

Guide for On-Site Assessment

- Use the NASM Plan Field Sketch Checklist document that you started in Step #1 as a guide to completing your on-site assessment.
- Walking the site allows you to observe the conditions and features that exist at the site and to evaluate the risks presented by these conditions.
- If possible, interview the Owner/Operator and have them accompany you on the field walk to point out any conditions and features relevant to the planned application of NASM.
- Record the Owner/Operator's answers, including the presence/absence of features so that they can be properly documented on the Field Sketch. *If the owner is not able to accompany you, ensure you follow up with the owner as necessary according to your Pre-Site Assessment Preparation.*
- If possible, schedule the assessment at a time of year when crops and weather do not limit your observations.
- The date of the assessment and your observations must be documented in the Field Sketch.



Best Practice:

Note any site conditions that may limit your observations of sensitive features. For example, standing crops or snow cover may limit your ability to see all the necessary features. Make sure you conduct another assessment of the site when site conditions have improved, and you are able to assess any features or areas that may have been missed. If any new features or other relevant information is identified during a subsequent visit, the site sketch needs to be updated to include that information.

The purpose of conducting an assessment on-site is to **confirm** the information gathered in your preparation and to check for **additional site features** that may not be apparent until you visit the site.

On-site Assessment Checklist



Walking the Site

You may wish to break the site into smaller areas that can be walked to determine specific features or setbacks

The order in which you walk the site is not as important as conducting a thorough and accurate on-site assessment.

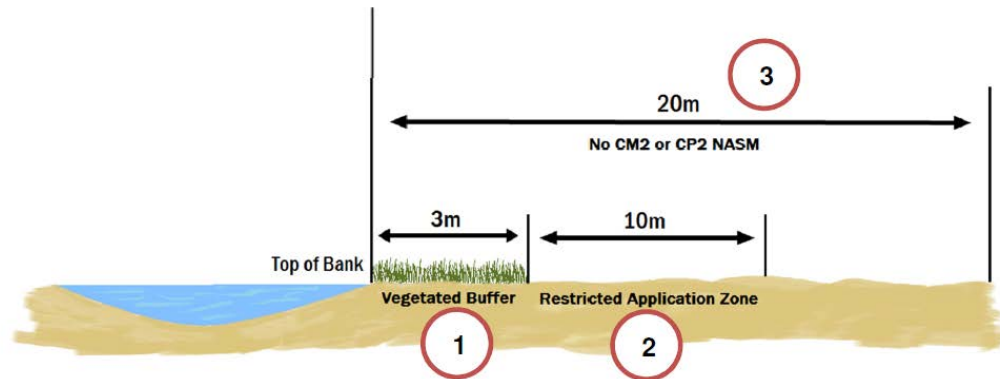


An example of dividing a site up into sections for the on-site assessment

As an example, you could:

1. Begin at the farmstead to locate/confirm wells, catchbasins, residences, NASM storages or other features relevant to the Field Sketch requirements.
2. Note the adjacent land uses.
3. Walk along/to any surface water on the site establishing setback distances, locating the top of bank, slopes toward and within 150m of surface water and identifying tile outlets.
4. Look for areas that may be defined as the Maximum Sustained Slope and measure the slope.
5. Within the fields, look for ponded areas, rock outcroppings, tile inlets and other relevant features. Where depth to bedrock is indicated as shallow in soil survey reports, small test pits should be dug on site to verify the depth to bedrock.

6. Lastly, walk the site property boundaries looking for and noting any adjacent residences and other land uses such as commercial or institutional where wells, tile inlets, surface water or other features required by the regulation may be present.



Setbacks to surface water that need to be determined during the on-site assessment

Measuring Distance

Distance measurements need to be accurately completed to meet regulatory separation distances and to determine that sloped areas meet the definition of Maximum Sustained Slope.³

Accurate distance measurements can also be used for pre-application flagging of setbacks.

There are a variety of online information sources and on-site tools that can be used to measure distance.

Not all information sources or tools produce distance measurements that are sufficiently accurate for clearly demonstrating that you have met the regulatory requirements for setbacks.

Refer to **Appendix B: Examples of Methods and Tools for Measuring Distances** for tools and information.

Determining the Maximum Sustained Slope

- Locate the areas of the NASM application area that are within 150m of surface water.
- Identify areas of the field that have slopes at least 10m in length and that slope towards surface water.

Site Assessment

- Choose a method to measure the percent slope ensuring that the method of measurement is accurate enough to determine which of the following categories the slope falls into:
 - 0% to 3%
 - 3% to < 6%
 - 6% to < 9%
 - 9% to < 12%
 - 12% or greater.
 - Where the slope measurement is on the border between two categories, Best Practice would dictate that you use the most restrictive slope value
 - Placing the slope accurately into these categories is essential to determining the run-off potential and whether liquid NASM can be applied.

The percent slope can be determined from several information sources or tools. However, not all information sources or tools produce percent slope values that are sufficiently accurate for determining the Maximum Sustained Slope.

Refer to **Appendix C: Information and Tools for Determining Slope** for examples of how to determine percent slope.

Step 3: Completing the Field Sketch



The Field Sketch must be based on the on-site assessment and completed in accordance with Nutrient Management Protocol 8.2.6.2.

Use the results and observations from the On-Site Assessment (Step #2) and information gathered in the Pre-Site Assessment Planning (if the information has been validated during the on-site assessment) to complete the Field Sketch.

A sketch for each field or section in the NASM Application Area is required. The NASM application area(s) must be accurately and clearly delineated. Don't forget to include the location of any NASM storage facilities.

Field Sketches may be hand drawn or computer generated. Aerial photos that are properly labelled are also acceptable. Make sure that the sketch is readable, especially if it has been photocopied. If the Field Sketch is complex or cluttered, you may wish to complete more than one sketch to show all of the relevant information.

All Field Sketches must address all the items identified in the Nutrient Management Protocol by identifying them on the sketch or by stating on the sketch that they do not exist. Include **setback distances** and **Maximum Sustained Slope** where applicable.

As a final check before submitting the NASM Plan for approval, you should ask the owner of the NASM plan area to review the Field Sketch to ensure that no features have been missed.

Lastly, complete each section of the "NASM Plan Field Sketch Checklist".



Best Practices:

- The sketch must include the Date of the on-site assessment and the individual who conducted the assessment.
- You may wish to develop a sketch template or legend that lists the items required in the Protocol.
- Displaying the location of the NASM Application Area by labelling roads, road names and the civic address of the site help you, your staff, reviewers or inspectors easily find the site.
- When the scale of the sketch is known, label the scale on the sketch. Where the sketch is not to scale, include a statement to inform the viewer that the map is not to scale. Make sure to include relevant dimensions and setbacks on the sketch.
- Orient the top of the map to north and include a North arrow on the sketch.
- If prior to or during land application of NASM the Prescribed Materials Application Business licensee or the Nutrient Application Technician observe any sensitive features not present on the Field Sketch, record the features on the Field Sketch. Ensure that the land owner, NASM Plan developer and all other persons involved with the land application are aware of, and maintain, the updated Field Sketch.

The purpose of conducting an assessment on-site is to confirm the information gathered in your planning and to check for additional site features that may not be apparent until you visit the site.

Appendix A: Examples of Online Information Sources for Pre-Site Assessment Preparation

The following are examples of mapping tools and the information that each provides.

Agricultural Information Atlas (AgMaps)

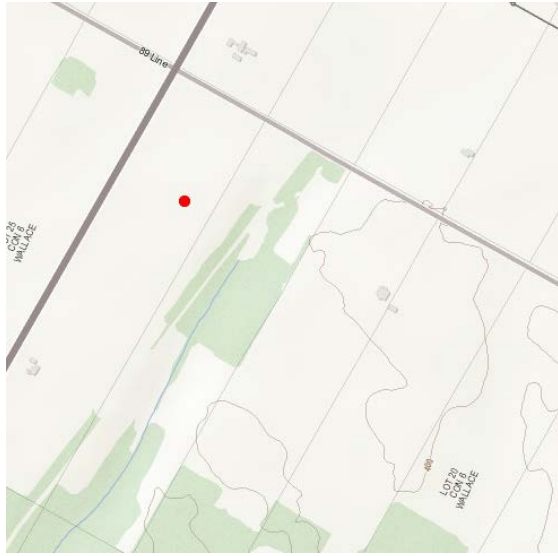
The Ontario Ministry of Agriculture, Food & Rural Affairs provides an online map tool called the Agricultural Information Atlas (AIA). The mapping tool can be found at ontario.ca/agmaps.

This tool contains the following information that can assist you in your pre-assessment planning and the development of a Field Sketch:

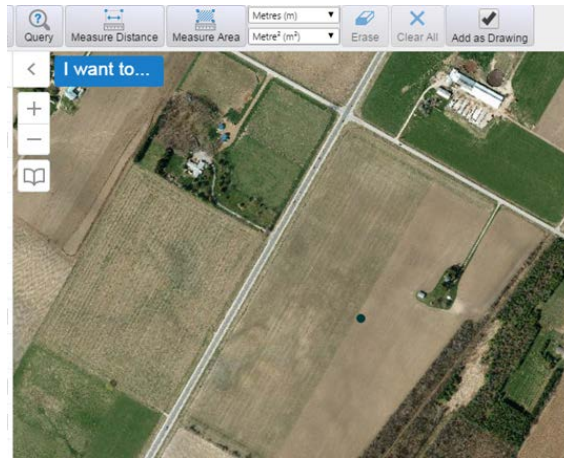
- **Municipal**
 - including Upper Tier and Lower Tier municipalities, Geographic Townships, Lots and Concessions, Assessment Parcels with roll numbers
- **Drainage**
 - including tile drainage, constructed drains and controlled drains
- **Soils**
 - including texture, Hydrologic Soil Group, drainage class and slope class
- **Topographic**
 - including contours, water courses, wooded areas, lots, concessions and geographic townships
- **Imagery**
 - currently the site uses aerial imagery that is a maximum of five years old.

*This mapping tool also provides the ability to measure approximate distances and area. However, given the scale of the data used in the mapping tool, **an on-site assessment must be conducted to verify distance and area measurements.***

Site Assessment



Example of topographic map from the AIA



Example of aerial imagery and measuring tools from AIA

Source Water Protection Maps

The Ontario Ministry of Environment and Climate Change provides an online map tool for Source Water Protection. The tool can be found at applications.ene.gov.on.ca/swp/en/.

This website can assist you in determining whether the site falls within a Well-Head Protection Area (WHPA), Intake Protection Zone (IPZ) or Issue Contributing Area (ICA). By typing the municipal address (i.e. 911 number, road name and municipality, lot/concession/township) into the search field, the tool will identify if the property is located within a source protection area and whether the site falls into a WHPA, IPZ or ICA. An external link may be provided to take you to the source protection plan to see if there are any policies that restrict land use activities.

You may search by address, latitude and longitude, lot and concession or see [help](#) for advanced options.

5927 line 89 north perth

The map has been navigated to, or near **5927 line 89 north perth**. Please verify the location for accuracy. If you want to change the location, drag the red pin to that location.

Legend

- Source Protection Areas (SPA)
- Issue Contributing Areas (ICA)
- Intake Protection Zones (IPZ)
 - IPZ 1
 - IPZ 2
 - IPZ 3
- Wellhead Protection Areas (WHPA)
 - WHPA A
 - WHPA B
 - WHPA C and C1
 - WHPA D
 - WHPA F - GUDI
 - WHPA E - GUDI
- Vulnerable Scoring Areas (VSA)
 - 0 to 3.9
 - 4 to 7.9
 - 8 to 8.9
 - 9 to 10
- Lots and Concessions
- Event Based Areas (EBA)
- Municipal Boundaries

Search Results

Location Information

Latitude: 43.792112 Longitude: -80.895469
UTM Zone: 17 Easting: 508410 Northing: 4848789
Upper Tier Municipality Name: COUNTY OF PERTH
Single and/or Lower Tier Municipality Name: MUNICIPALITY OF NORTH PERTH
Township, Concession and Lot: WALLACE

Source Water Protection Details for Location

Source Protection Area: Maitland Valley
Wellhead Protection Area: No
WHPA E (GUDI): No
Intake Protection Zone: No
Issue Contributing Area: No
Significant Groundwater Recharge Area: No
Highly Vulnerable Aquifer: No
Event Based Area: No
To see if any land activities are restricted, check the policies in the source protection plan (links to external web page).
Information is current as of: 06-02-2016

Hover over the legend to see information about each layer.

For additional help, please contact source.protection@ontario.ca.

Example output from the Source Water Protection mapping tool

Searching in the Source Water Protection mapping tool

Appendix B: Examples of Methods and Tools for Measuring Distances

The following are a few examples of tools and methods used for measuring distances.

Topographic Maps

Whether hard copy maps or online, topographic maps can be used to measure distance. A ruler or other measuring device can be used to measure the distance between two points on the hard copy map. This distance must be adjusted based on the map scale. Many topographic maps commonly have scales of 1:10000 or 1:50000.

Note that not all features required for a NASM Field sketch are contained on a topographic map. For example, most topographic maps contain rivers and streams but may not display all types of surface water and do not usually display private water wells.

Also note the date of the map, or data used to create the map. Older maps or information sources can be out of date. An on-site assessment is needed to validate the distance measurement.

Hand-held Global Positioning Systems (GPS)

Most hand-held GPS have the capability to measure the distance between two points. Know the accuracy of your hand-held GPS. Many units have a horizontal accuracy of 1m. Where the distance measured by the GPS is slightly above or below the regulatory requirements, use the more restrictive measurement or use a device that can provide better accuracy.

Distance Measuring Wheels

Measuring wheels can be used to measure longer distances in a relatively short amount of time. Larger diameter wheels are better for topography that is not smooth. It is a best practice to calibrate the wheel on a variety of terrains against a known distance such as a steel tape measure. Calibration of the wheel can indicate the relative accuracy of the wheel under different terrain conditions.

Steel or Fibreglass Tape Measures

Tape measures can be used to measure relatively short distances.

Note that fibreglass tapes can shrink or stretch in hot or cold weather. Take care to ensure that steel tapes do not bend or kink. Either of these scenarios can reduce the accuracy of the measurement. Best practice would dictate that you go with the most restrictive distance measurement when the measurement is very close to the regulatory distance. In some instances, you may wish to pace out a short distance. Calibrate your pacing against a known distance using the tape measure so that you know how many paces equal a given distance. For example, 10m on the ground may be equal to 12 paces. However, this number will vary for individuals based on the length of their stride.

Laser Range Finder (LRF)

LRF emit laser beams that bounce off distant targets. The high-speed clock in the LRF measures the total time it took from when the beams left the unit until they returned. Using that total time measurement, the rangefinder calculates the distance and displays it to the user.

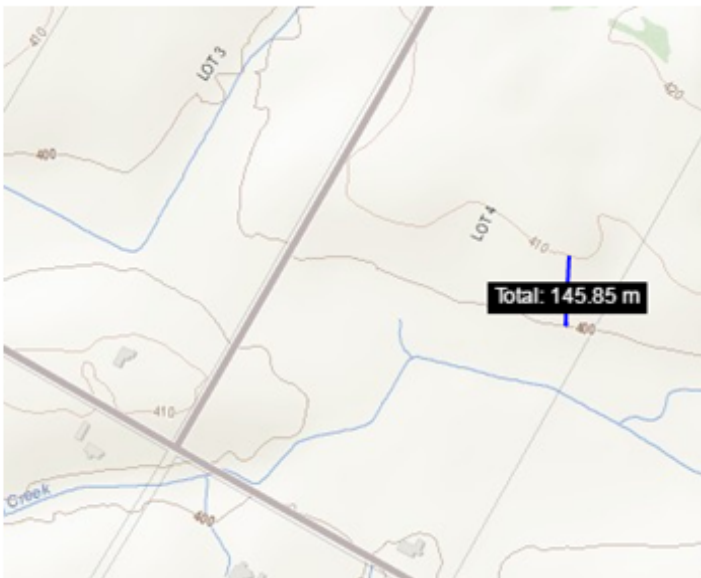
Many sporting LRF can measure distances up to 750m. Care must be taken to ensure that the laser beam is bouncing back from the target you intended to measure and not another object in between. Best practice would dictate that you compare the distance measured by the LRF to a known distance as a means of calibration before using the instrument for a site assessment.

Appendix C: Examples of Information Sources and Tools for Calculating Slope

The following are a few examples of information sources and tools and how they can be used to calculate slope.

Topographic Maps

Whether hard copy maps or online, topographic maps can be a source of percent slope. Contour lines on these maps provide elevation data while a map scale can be used to determine the distance between the contours. The contour and distance values can be used to calculate rise over run to determine a percent slope. However, most topographic maps in Ontario show contour intervals of 5m and have map scales of 1:10,000. Topographic maps may not provide the level of accuracy required to determine Maximum Sustained Slope as defined by Regulation 267/03. An on-site assessment is necessary to validate the percent slope and to determine the Maximum Sustained Slope.



In this example above, the distance between the contour lines is 145.85 m and the difference in elevation of the contour intervals is 5m. Therefore the rise/run = $5/145.85 = 0.034 \times 100 = 3.4\%$ slope

Example of determining slope from a Topographic Map

Soil Survey Reports

Whether hard copy or digital, most soil survey reports include a slope class for each soil type. These maps are produced on a County-wide basis and vary in scale from 1:20,000 to 1:66,000 which may not provide the level of accuracy required to determine Maximum Sustained Slope as defined by Regulation 267/03. An on-site assessment is necessary to validate the percent slope and to determine the Maximum Sustained Slope.

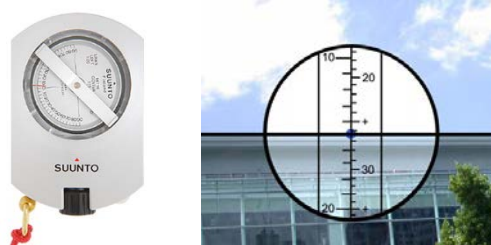
Hand-held Global Positioning Systems (GPS)

A variety of hand-held GPS devices are available that have the capability to measure elevation. Knowing the vertical difference between two points can provide the 'rise' while measuring the horizontal difference between the same two points can provide the 'run'. However, most of the basic hand-held units have a horizontal accuracy of 1m. Vertical accuracy is 2.5 to 5x the horizontal accuracy. Unless the GPS is capable of sub-centimetre accuracy, the vertical accuracy will not be suitable for determining maximum sustained slope. **An on-site assessment is necessary to validate the percent slope and to determine the Maximum Sustained Slope.**

Smart-Phone Apps

Several free Apps are available for mobile phones that can be used as a level and to measure slope. However, you will need to verify the accuracy of these measurements. It can be difficult to hold the phone in a way that both measures slope and provides an accurate reading.

Clinometer

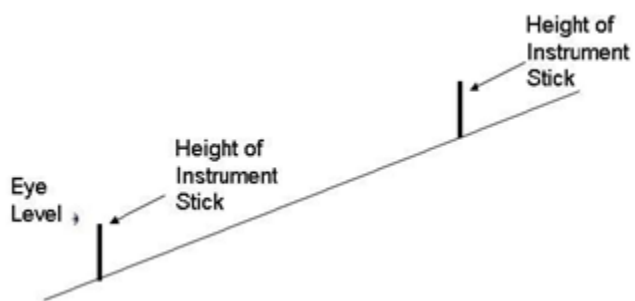


Clinometer is a tool commonly used to measure [slope](#), vertical angles and in combination with distance measurements – elevation change or tree heights.

Site Assessment

The clinometer most often has two scales: Percent and Degrees. Percent is on the right while Degrees is on the left. Slope is measured using the percent scale for the purposes of Maximum Sustained Slope.

When used with a second person or a target equal to the user's eye height, a clinometer can be accurate enough to measure Maximum Sustained Slope. Make sure to establish the height of your eye level. Use this height as a target on the second person or stick to ensure that you are using the clinometer effectively. Height of instrument sticks can be fashioned from a simple fence stake and plastic pipe, or a proper survey rod can be used.



Example of how a clinometer, to be used effectively, requires a 'target' equal to the user's eye level height

Image source: https://en.wikipedia.org/wiki/File:Measuring_Slope_With_a_Clinometer_2.JPG



Example of a simple height of instrument stick made from a fence stake and plastic pipe. The flagging tape represents eye height and is used as a target when using the clinometer.