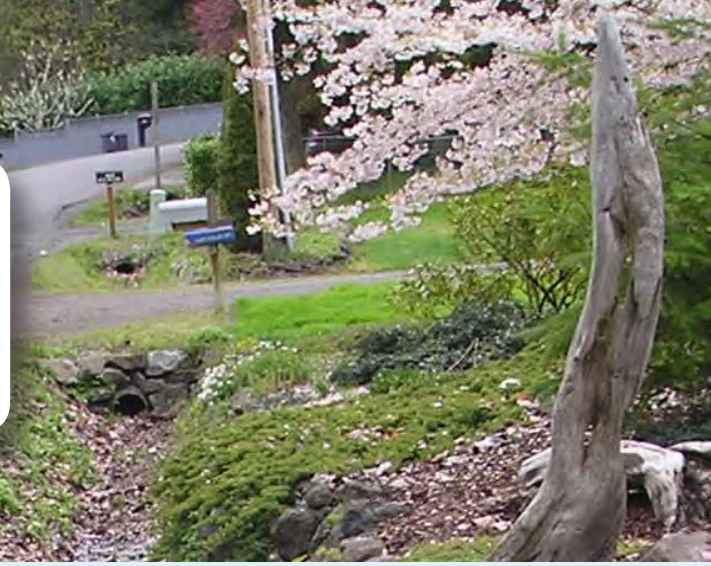




Considerations for Field Evaluation of Roadside Ditches

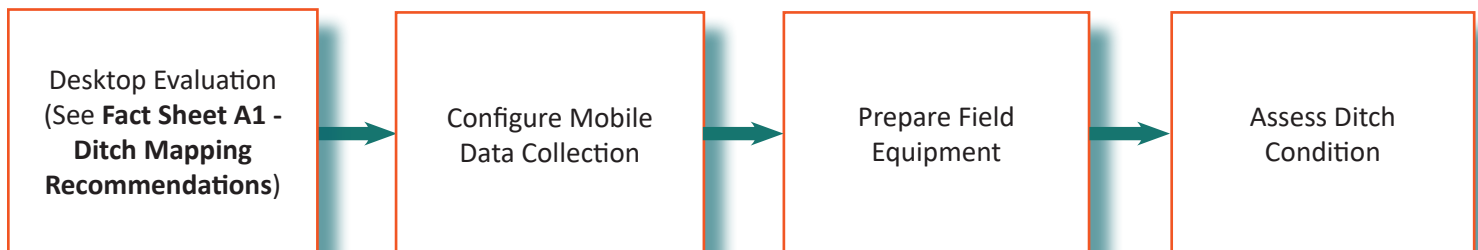


Fact Sheet F1

February 7, 2019

Data Collection Methods

This fact sheet will support inspection and maintenance staff in conducting a field evaluation of roadside ditches to efficiently document ditch status and maintenance needs. The workflow for completing a ditch field evaluation is shown below:



Configure Mobile Data Collection

Data Collection Methods



Data collection: Handheld GPS and mobile device units

Electronic data collection is recommended for efficiently capturing detailed data. Electronic devices streamline the data collection process by:

- Minimizing post-processing or typing data into spreadsheets after a long field day.
- Allowing field crews to attach photos directly to the database, therefore avoiding the need to sort and re-label.
- Using checkboxes and drop-downs to standardize data entries by multiple people and prevent misspellings and other data entry errors.





Configure Mobile Data Collection

Data Collection Methods

Ideally, a large-screen tablet is recommended for readability and quick data entry; however, smaller devices such as mobile phones can also be used to collect electronic data and store field photos. Mobile devices can be paired with various brands of global positioning system (GPS) satellite receivers to improve location accuracy, if desired.

Getting Started with a Mobile App

Electronic data collection may sound complicated, but if your municipality is already using geographic information system (GIS) software to map ditches, set-up and rollout of electronic data collection can be relatively easy.



Talk to your local GIS staff to see what options are available for bringing ditch data online. Field crews will need access to an online account.

Enable database photo attachments.

Find a mobile device suitable for field work.

Download ESRI's free mobile data collection applications (e.g., Collector, Survey123).

Consider offline data collection for remote areas without cell service.

Other specialized survey or questionnaire-focused mobile applications and other asset management software is available with varying cost-structures and functionalities.



Data collection by using both a hand-drawn field map and a handheld GPS device in areas with limited cell service.

Field Tip: Include a notes field in your field form or data collection matrix to capture unique circumstances that field crews may encounter.



Prepare Field Equipment

Safety First

For quick and safe field evaluation of roadside ditches, field crews should note the following:



Wearing Personal Protective Equipment (PPE)*

✔ Many ditches do not have safe nearby parking or wide shoulders. High-visibility safety vests/jackets and traffic cones are critical. Gloves are also recommended for potentially hazardous or unsanitary materials, noxious vegetation, etc. Hard hats may be required when working near roads. Defer to local jurisdiction for safety requirements.



Safety Concern:
Narrow road shoulders

✔ Be prepared for dangerous conditions in erosion/slope hazard areas. The roadside ditch may be wedged between a busy road with a high-speed limit and a steep slope, leaving field crews without much distance between fast moving traffic. These ditches are not recommended for field evaluation without proper traffic control in place.



Safety Concern:
Steep slopes on high traffic roads with overgrown vegetation

✔ When Himalayan blackberries or other aggressive vegetation is encountered, field crews cannot make an accurate assessments and have limited space to conduct evaluations. If encountered, it is recommended to schedule these ditches for brush cutting prior to completing field evaluations.

*Defer to local jurisdiction PPE requirements



Prepare Field Equipment

Equipment and Materials Recommendations

The roadside ditch field evaluation is primarily based on visual observations and does not require any high-tech equipment. Recommended equipment and materials include:



Personal Protective Equipment (PPE) (e.g., high-visibility vest/jacket, hardhat, gloves)



Traffic cones and other traffic control equipment



Large-screen tablet equipped with a glare-resistant screen protector and a protective (waterproof, drop-proof) field case



Backup paper forms and pencils/pens



Noxious Weeds that Harm Washington State, Western Washington Field Guide. You can request free hard copies of this pocket guide from the Washington State Noxious Weed Control Board (www.nwcb.wa.gov)



WA Invasives mobile app (<https://invasivespecies.wa.gov>)

If ditches are missing basic characterization data (e.g., length, width, etc.), the following equipment is also recommended:

- ✓ Measuring tape (short)
- ✓ Measuring tape (long)
- ✓ Slope measurement device (e.g., electronic, surveying rod)

Field Tip: Always bring a portable backup battery and/or a car charger when using a tablet or mobile phone for data collection. The battery may drain quickly!

Field Tip: In some cases, safety concerns may make it difficult to collect characterization measurements. Because these measurements are only informative and not critical to prioritizing and implementing a maintenance program, it is recommended to skip these measurements in unsafe areas.



Planning ahead and bringing proper equipment can promote safety and efficiency in remote or high-risk locations



Assess Ditch Condition

A streamlined inspection for maintenance needs is also recommended as part of the field evaluation. Due to the variety of ditch shapes, surface types, and other unique conditions that might be encountered at a ditch, it is recommended to focus on broad categories related to critical ditch function (e.g., conveyance, water quality, etc.) and road safety. If needed, specific details can be recorded in an open notes field within the database. Categories that should be assessed include:

Field Tip: Always take photos in the field.

Geolocated photos can be attached to the ditch database and used to confirm ditch condition or to communicate specific maintenance needs.

Capacity and Conveyance



- Can the ditch convey flow freely?
- Have blocked culverts or failed structural components caused localized flooding of nearby property or roadways?
- Is there evidence of the ditch conveying natural flows?

Structural Components



- Are structural components broken or damaged?
- Are structural components causing flow blockages?

Vegetation



- Does the ditch need to be mowed?
- Are there line-of-sight issues associated with overgrown ditch vegetation?
- Is vegetation sparse or absent?
- Is lack of vegetation causing erosion?
- Are invasive or noxious species present?

Integrity



- Is there evidence of erosion, channelization, or scouring?
- Are there nuisance animals (e.g., moles, beavers) present that may put ditch flow capacity or structural integrity at risk?
- Are ditch side slopes intact and stabilized?
- Is there evidence of a potential illicit connection or illegal dumping?

See **Fact Sheet A2 - Prioritizing Ditches for Inspection and Maintenance** for guidance on how to incorporate field data into a scoring matrix that can be used for ditch maintenance prioritization.