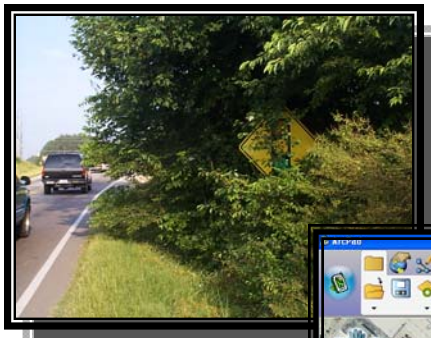
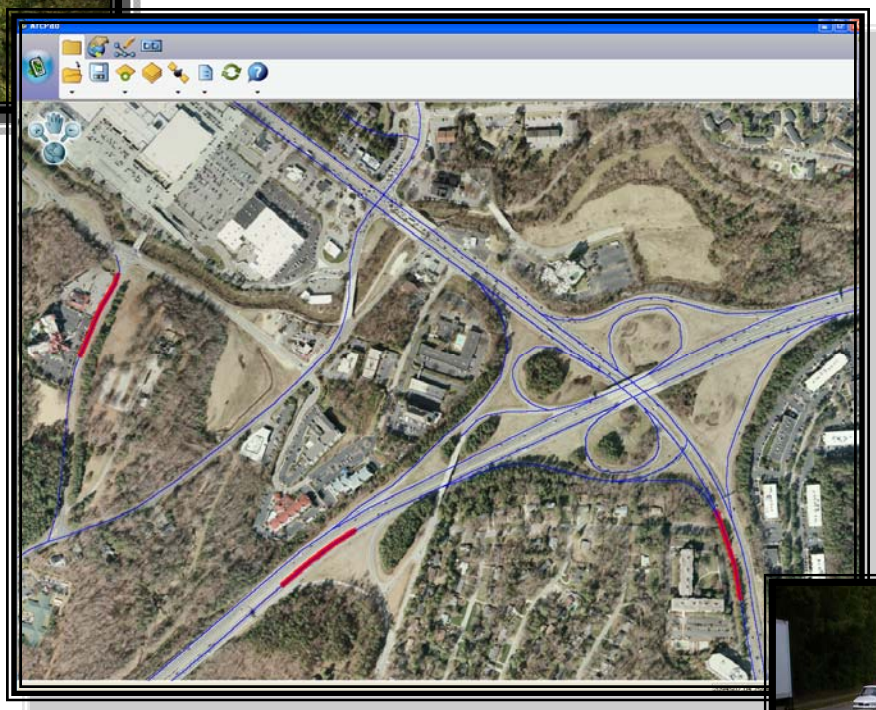
NCDOT NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

Connecting people and places in North Carolina — safely and efficiently, with accountability and environmental sensitivity.

Maintenance Condition Assessment Program

2011 Manual





srmu State Road Maintenance Unit

Maintenance Condition Assessment Program

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Inside This Manual

PREFACE

Welcome to the Team!! Thanks to you, the North Carolina Department of Transportation continues to improve and enhance it's maintenance management system.

The collection of data on the condition of state-maintained highways will provide an indication of the level of maintenance we are now providing. This information will enable us to address funding level needs and develop a strategy for prioritizing maintenance operations.

This manual presents the procedures of the maintenance condition survey. Instructions on the collection and reporting of survey data are provided, as well as detailed descriptions, examples, and illustrations of the features to be measured. In addition, a summary of these feature definitions is provided in the appendix.

It is imperative that the surveys be conducted in a timely manner, and that the data is uploaded as soon as practical. If you have any trouble or questions, contact:

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INTRODUCTION

Quality assurance in highway maintenance has been the subject of study and discourse for several years. It may best be described as the planned and systematic actions needed to provide adequate confidence that highway facilities meet specified requirements. Such requirements are usually defined by the highway agency but are intended to reflect the needs and expectations of the user.

First largely considered in the 1960s as part of the maintenance management system concept, the issue of quality assurance in highway maintenance has since remained an active topic due mainly to increased work loads, greater maintenance demands, limited maintenance funds, and public perceptions of maintenance departments. The need for better quality maintenance has increased significantly within the last few years in recognition of the change in focus from new highway construction to maintenance and rehabilitation of existing roadways.

The purpose of this manual is to provide a method for collecting roadway maintenance information in order to determine the overall condition of highways in the state. With this data, a maintenance needs report can be generated addressing required funding levels, a strategy for prioritizing maintenance operations, and areas of excessively high or low maintenance. This maintenance condition survey is the first, and perhaps the most important, step of a maintenance management system for NCDOT. A quality management system must be based upon good data, therefore it is imperative that the information collected is uniform and consistent.

**To record time worked and receive payment, you will need to log into SAP and use the following information:

WBS #_____

Function Code # _____

Cost Center # _____

CONDUCTING THE ASSESSMENT/SURVEY

The maintenance condition assessment program has been developed to assist the NCDOT to plan, schedule, budget, and report highway maintenance activities and needs. The agency has performance standards that describe how individual maintenance tasks are to be performed, the resources required to carry out the task, and the expected rate of production. The information from this maintenance condition survey will be used to evaluate the effectiveness of maintenance performance and identify opportunities for improvement. To maintain credibility of the program, the data must be collected accurately and completely.

Rating teams will be composed of two persons, and will be responsible for conducting the survey and reporting the findings. Each team will be assigned random segments for survey. The element features will be reviewed and assessed according to the criteria in the next chapter. To assure statewide uniformity of the maintenance inventory system, there should be no deviation from the criteria. Several passes through the survey segment may be required to adequately assess each feature.

Because the reviews will be made on foot, special precautions must be made for protection of the reviewers from traffic. The team's first responsibility is the safety of motorists, pedestrians, and themselves. Always be aware of traffic conditions. For the safety of the crew, it may be necessary to schedule the survey of those segments with high traffic volumes during off-peak traffic periods. The survey team should walk together, on the same side of the road, facing traffic as the segment is evaluated. This is for the protection of the team, and to assure that features will not be overlooked.

A list of equipment and supplies that should be used by the survey team is shown on the following page. While some of these are necessary for proper collection of the data, other items will make the survey safer and more efficient.

Also, if there is a problem with the randomly-selected site, do not survey the section. Such problems could be but not limited too:

- the road is under construction,
- it is in an interchange area,
- a significant portion of the road segment is bridge structure,
- the route is unpaved
- the route happens to be a Ferry Route, not a drivable road.

On the Tablet form select "Section Skipped" and hit the "Ok" button. Then proceed to an alternate section to survey and make up for the section that was previously skipped.

If the majority of the section is NOT affected by the issues above, you may still assess it. However, you will need to assess ONLY the length up to where the interference comes in. Do not move the segment. You will then denote the new distance on your form in the comments section.

Equipment Needed

- Personal Protective Equipment (safety vest, foot protection, etc.)
- Roof-top revolving amber light
- Copy of the *Maintenance Condition Survey* manual
- Clipboard
- Pencils and erasers
- Vehicle-installed distance measuring instrument -Optional-
- Measuring wheel or tape
- Small measuring ruler (6 in)
- Straightedge
- Insect repellent with Deet
- First aid kit
- Calculator
- Bush axe / Machete
- Gloves
- Tablet PC
- GPS Receiver
- Binoculars
- Flashlight
- USB Flash Drive (Memory stick for Data)

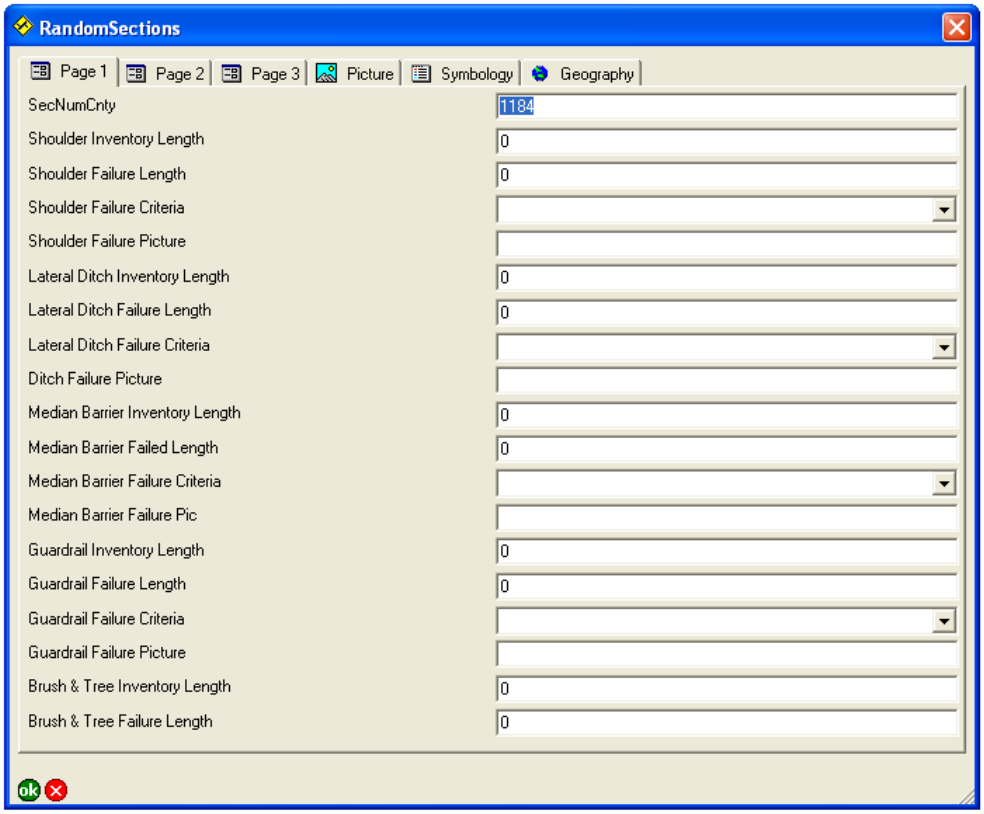
REPORTING ASSESSMENT DATA

The information collected during the Assessment will be recorded using Tablet type PCs with ArcPad Software. An Example of the electronic Form you will fill out for the random sections is shown on the next page. All pertinent information will be filled in by the assessor in the given blanks or by using drop down menus. The date of the survey and names of those conducting the survey must also be entered on the form. It is important that the inventory form be filled out completely. All information blocks on the form must be completed. If a segment can not be assessed then make sure to select "Section Skipped" on the electronic form before moving on. If you do have to skip a main line section, be sure to assess one of the reserve sections. If a feature does not exist in the segment (for example, there may be no guardrail), enter "0" in both the Inventory and Condition blocks.

Quality Control visits will be made by both SRMU personnel and the QA team while the Assessment is being conducted. This will assist the raters by clearing up questions and problems that may arise and ensures data quality. Any remarks about the Assessment can also be made on the back sheet in this manual. If a concern needs to be addressed immediately, use the contact information to get ahold of one of the State Road Maintenance employees located on page 1. Or if needed, an email can be sent to MCAP_Help@ncdot.gov.

For the first week, each day data will be backed up on the supplied USB memory devices and uploaded to the network . The following weeks the data shall be uploaded weekly.

REPORTING ASSESSMENT DATA



Example: Random Segment Assessment Form in ArcPad

ELEMENT FEATURES AND CONDITIONS

This chapter provides a procedure for collecting information in order to evaluate the condition of random sections of roads maintained by NCDOT. The results from this survey will be used to estimate the overall condition of roadways throughout the state and determine highway maintenance needs.

Four maintenance elements will be rated for each survey segment: (1) unpaved shoulders and ditches, (2) drainage, (3) roadside, and (4) traffic control devices. Each element will consist of several features and characteristics that will be evaluated against certain threshold conditions. The elements and their features to be rated are shown on the following table.

An explanation of each feature follows in this chapter with a description of the feature, the threshold condition that will be rated, and photographs of the characteristics of each feature. The descriptions also provide methods of measuring the features and any special instructions to take into account during the survey.

Each team will be assigned several segments for survey. The element features will be reviewed and assessed according to the criteria on the following pages. To assure statewide uniformity of the maintenance inventory system, there should be no deviation from the criteria.

Several passes through the survey segment site may be required to adequately assess each feature. Because most of the reviews will be made on foot, special precautions must be made for protection of the reviewers from traffic. Always be aware of traffic conditions.

ELEMENT FEATURES AND CONDITIONS

Element 1 - Unpaved Shoulders and Ditches

Shoulders
Lateral Ditches

Element 2 – Drainage

Crossline Pipes Blocked
Crossline Pipes Damaged
Gutters Blocked
Inlets (Blocked or Damaged)

Element 3 – Roadside

Brush & Tree Control
Turf Condition

Element 4 - Traffic Control Devices

Pavement Striping
Words & Symbols
Pavement Markers

SHOULDERS AND DITCHES

Within a sample section, you will need to assess the Shoulders and Ditches. Where there is unpaved shoulder, the section will be assessed for the presence of both Low and High shoulder. For unpaved shoulders, two longitudinal measurements will be recorded: the Total Segment Inventory of unpaved shoulders and the Measured Amount that the feature exceeds the threshold conditions.

Unpaved Shoulders (Low & High)

Feature Description:

Low Shoulders occur when the elevation of the unpaved shoulder is lower than the roadway edge of pavement. A low shoulder can result in an unsafe recovery in the event a vehicle leaves the roadway. A low shoulder can also hold water that may eventually penetrate the base and subgrade and weaken the roadway.

High Shoulders occur when the elevation of the unpaved shoulder is higher than that of the roadway edge of pavement. A high shoulder can restrict water drainage and result in ponding at the edge of roadway. The standing water can cause vehicle hydroplaning, and may also infiltrate the base and subgrade and weaken the roadway. The relief of ponding caused by a high shoulder may also scour the shoulder and front slope.

Threshold Condition:

A ***Low Shoulder*** should be noted where there is a drop-off greater than **3”** within the shoulder width or 10’, which ever is less.

A ***High Shoulder*** should be noted where the elevation difference is **2”** above the road surface, or higher within the shoulder width or 10’, which ever is less.

Total Sample Section Inventory: The total shoulder length in the segment will be recorded. For example, if a typical two-lane, two-way roadway is being inspected, the total shoulder length will be 1,056 feet (0.1 mi. x 5,280 ft. x 2 shoulders). For the assessment of a four-lane roadway divided by a grass median, the total shoulder length may be 2,112 feet (0.1 mi. x 5,280 ft. x 4 shoulders).

Measured Amount: Each shoulder in the segment is to be evaluated. The Measured Amount is the longitudinal length wherever a shoulder exceeds the given threshold condition listed above for both Low and High Shoulders within the sample section being assessed. On the ArcPad form, record the sum of the lengths, **in Feet**, that meet both conditions.

Special Instructions: There may be an area in the sample section where an unpaved shoulder does not exist due to curb and gutter, valley gutter, median barrier, paved shoulder, etc. When this occurs, the Total Sample Section Inventory must be reduced by the length of these features. If a portion of the shoulder is paved and the width is 10’ or greater, then the Total Sample Section Inventory must be reduced by that portion of the section length.

SHOULDERS AND DITCHES

Examples: Low Shoulders

Examples: High Shoulders

SHOULDERS AND DITCHES

Within a sample section that is being assessed only one ditch feature will be rated. When assessing Lateral Ditches, two longitudinal measurements will be recorded: the Total Segment Inventory of the Lateral Ditch and the Measured Amount that the feature exceeds the threshold condition.

Lateral Ditches

Feature Description: Lateral ditches are trough-shaped channels oriented parallel to the roadway. Located along the roadside and in medians, these ditches are constructed to collect and disperse surface water in a controlled manner, and assist in the drawdown of groundwater from the road base to prevent saturation and loss of support. A blocked ditch can cause saturation of the base and subgrade, which may lead to pavement failure. The relief of ponding caused by a blocked ditch may also erode downstream slopes and ditches when the water is released. Because ditches are constructed to collect and disperse surface water in a controlled manner, they are often seeded and mulched to prevent erosion but may be lined with rip rap or even paved. A proper lining helps dissipate water flow velocities, and it prevents loss of roadbed support by stabilizing the soil. Ditch erosion can not only impact road stabilization and contaminate natural drainage areas, it can also be a safety problem for errant motorists.

Threshold Condition: Lateral ditches that are **50% blocked** or more and are not functioning properly should be noted. An eroded lateral ditch should be noted when there is a lining loss of **1 foot** below the original ditch line, or lower. There should also be no joint separation, misalignment, or undermining in paved ditches.

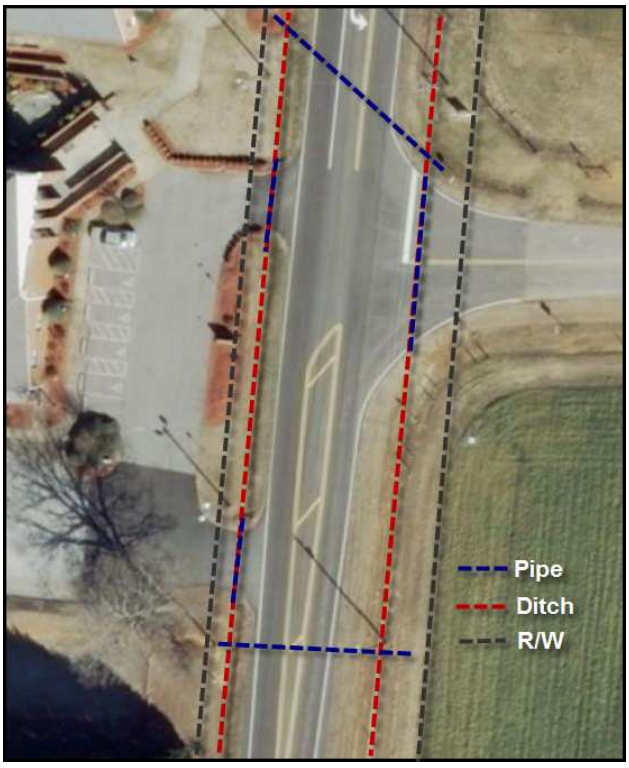
Total Sample Section Inventory: The total lateral ditch length in the segment will be recorded. For example, if a typical two-lane, two-way roadway is being inspected, the total ditch length will be 1,056 feet (0.1 mi. x 5,280 ft. x 2 ditches). For the assessment of a four-lane roadway divided by a grass median that has a single median lateral ditch, the total ditch length will be 1,584 feet (0.1 mi. x 5,280 ft. x 3 ditches).

Measured Amount: Each lateral ditch in the segment is to be evaluated. Once the ditch's design shape is determined, check where blockage occurs that is 50% or higher from the ditch invert or where the ditch has eroded 1 foot or lower than the original ditch line. When noted, measure the longitudinal length of blocked ditches (that are not functioning properly) and eroded ditches. Record the sum of the lengths of blocked and eroded ditches.

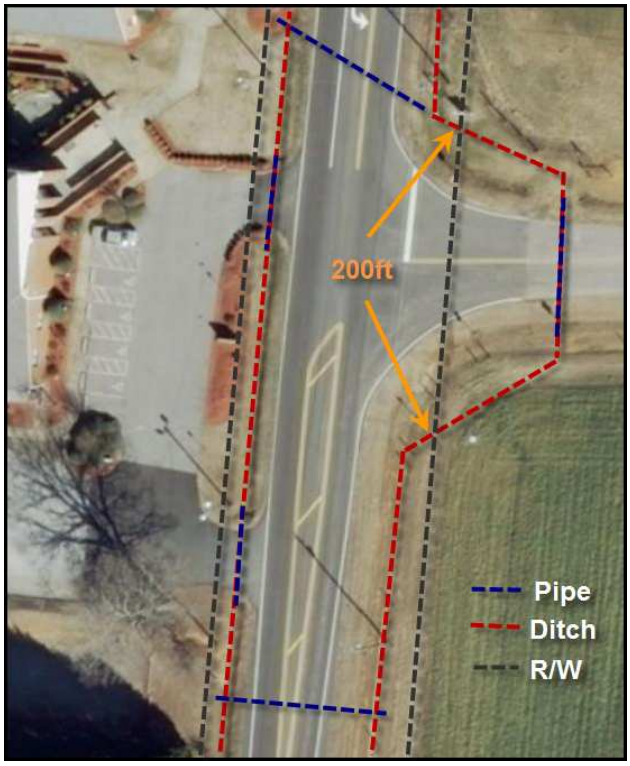
Special Instructions: Outfall ditches will not be rated as part of this survey. Also, DO NOT deduct ordinary driveway pipe or pipe that is running parallel to the roadway that is associated with a side street. These will still count as part of the ditch inventory. The only exception is when the ditch line leaves the ROW. (Turn to page 12-A for example) While ordinary pipe will not be assessed for damages or erosion, it will be assessed for blockage. If either inlet or outlet is 50% blocked or more, include the length of the pipe in the sum of blocked and eroded ditches. Also if a lateral ditch is piped it will be treated the same as the pipes previously mentioned, regardless of the length. If ditch is filled in and there is no pipe, DO NOT inventory as ditch.

Examples: Lateral Ditches — Blocked

Examples: Lateral Ditches — Eroded

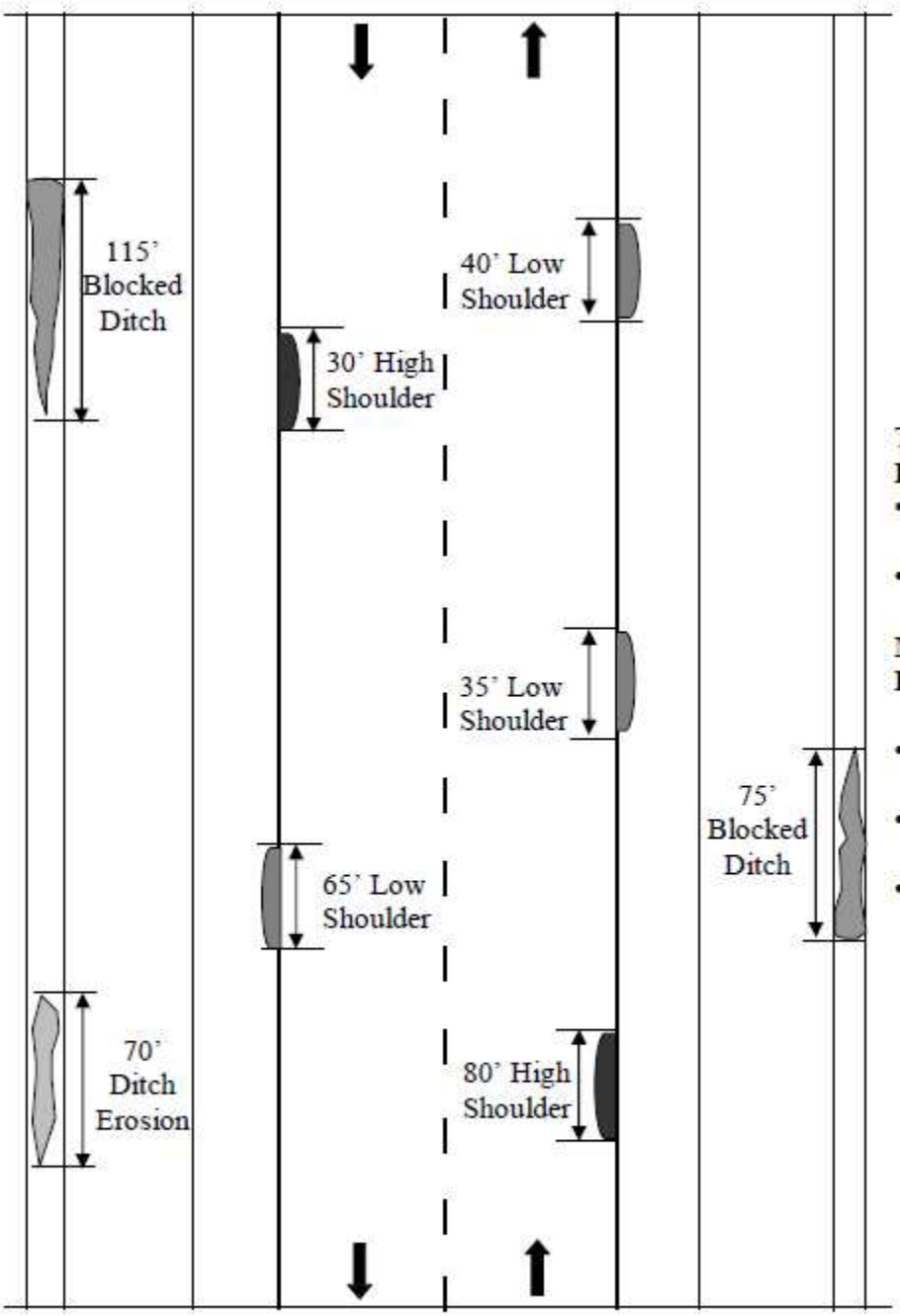


Example: Ditch Inventory = 1056' & Crossline Inventory = 2



Example: Ditch Inventory = 856' & Crossline Inventory =2

Example: Unpaved Shoulders & Ditches



Total Segment Inventory

- Shoulder - _____
- Ditches - _____

Measured Amount Exceeding Threshold

- Low Shoulders - '= _____
- High Shoulder - = _____
- Lateral Ditches - '= _____

DRAINAGE

Three drainage features will be rated: crossline pipes, gutters, and inlets. For each feature, two measurements will be recorded.

Except for gutters, the total number of drainage features in the segment will be noted as the Total Segment Inventory. Then, the number of these features that do not meet the threshold condition will be recorded as the Measured Amount. For gutters, the total longitudinal length of gutter in the segment will be recorded as the Total Segment Inventory. Next, the length of gutters exceeding the threshold conditions will be recorded as the Measured Amount.

Crossline Pipes Blocked

Feature Description: Crossline pipes are subsurface conduits that carry water under the road way to the natural drainage area. Designed for each location, pipes come in a variety of materials, sizes, and shapes. If a blocked pipe causes ponding at the inlet and in the upstream ditch, the water can penetrate the subgrade and weaken the roadway. A restricted pipe can also result in scouring at the outlet due to the increased water flow.

Threshold Condition:

1. Crossline pipes shall have openings greater than **50%** of diameter open.
2. No eroded area at the inlet or outlet that is wider or longer than 1.5 times the pipe diameter and greater than 6” deep.

Total Inventory: The total number of crossline pipes in the segment will be recorded.

Measured Amount: If at all possible, each crossline pipe in the segment is to be evaluated. If either inlet or outlet is 50% blocked or more, that pipe will be recorded as a single feature that does not met the threshold condition. On the ArcPad form, record the number of crossline pipes that are blocked.

Special Instructions: Only Crossline Pipes maintained by Roadway Maintenance (48 inches or less) will be evaluated. Pipes and culverts maintained by Bridge Maintenance (larger than 48 inches) will not be rated as crosslines. Drainage pipes that are part of a closed system will not be assessed. At intersecting roadways, either driveway or side street, crossline pipes will only be evaluated as part of the ditch. Crossline pipes are only the pipes that cross perpendicular or at an angle over the evaluated roadway. See page 12-A for an example.

Examples: Crossline Pipes Blocked

DRAINAGE

Three drainage features will be rated: crossline pipes, gutters, and inlets. For each feature, two measurements will be recorded.

Except for gutters, the total number of drainage features in the segment will be noted as the Total Segment Inventory. Then, the number of these features that do not meet the threshold condition will be recorded as the Measured Amount. For gutters, the total longitudinal length of gutter in the segment will be recorded as the Total Segment Inventory. Next, the length of gutters exceeding the threshold conditions will be recorded as the Measured Amount.

Crossline Pipes Damaged

Feature Description: See feature description for Crossline Pipes Blocked. If the pipe is damaged due to cracking, joint failures, or corrosion, water infiltration and exfiltration may result in loss of fines from the subgrade, causing roadway settlement and pavement failure.

Threshold Condition: Where a pipe is **damaged** so that it affects the functionality of the system, it should be noted.

1. No damage due to cracking, joint failures, or corrosion.
2. No water infiltration causing pavement failures, shoulder failures, or roadway settlement.

Total Inventory: The total number of crossline pipes in the segment will be recorded.

Measured Amount: If at all possible, each crossline pipe in the segment is to be evaluated. If the pipe is damaged, that pipe will be recorded as a single feature that does not met the threshold condition. On the survey form, record the number of crossline pipes that are damaged.

Special Instructions: Only Crossline Pipes maintained by Roadway Maintenance (48 inches or less) will be evaluated. Pipes and culverts maintained by Bridge Maintenance (larger than 48 inches) will not be rated as crosslines. Drainage pipes that are part of a closed system will not be assessed. At intersecting roadways, either driveway or side street, crossline pipes will only be evaluated as part of the ditch. Crossline pipes are only the pipes that cross perpendicular or at an angle over the evaluated roadway. See page 12-A for an example.

Example: Crossline Pipe Damaged

DRAINAGE

Three drainage features will be rated: crossline pipes, gutters, and inlets. For each feature, two measurements will be recorded.

Except for gutters, the total number of drainage features in the segment will be noted as the Total Segment Inventory. Then, the number of these features that do not meet the threshold condition will be recorded as the Measured Amount. For gutters, the total longitudinal length of gutter in the segment will be recorded as the Total Segment Inventory. Next, the length of gutters exceeding the threshold conditions will be recorded as the Measured Amount.

Gutters Blocked

Feature Description: Gutters are open drainage channels that direct the flow of water from the road surface and roadside area to a catch basin or other outlet. Examples of open-channel gutters are curb and gutter and valley gutter. Also if concrete barrier is present, the base on each side serves as Curb & Gutter and is to be recorded as such. An obstruction in the gutter may divert water flow onto the travelway and cause vehicle hydroplaning.

Threshold Condition: Gutters that are not functioning as designed due to an obstruction that is **2-inches or greater in depth for at least 2 feet** of gutter length should be noted

Total Segment Inventory: The total gutter length in the segment will be recorded. For example, if a typical five-lane roadway is being inspected, and it has a median concrete barrier and Curb & Gutter on the outside, the total curb and gutter length will be 2,112 feet (0.1 mi. x 5,280 ft. x 4 gutters).

Measured Amount: Measure the longitudinal length wherever a gutter is not functioning as designed due to an obstruction 2 inches or greater for at least 2 feet of curb length. On the ArcPad form, record the sum of the lengths of gutter that meet or exceed this condition.

Special Instructions: Blockage will not be noted if it will not obstruct water flow (grass growing in a construction joint, trash that will be flushed clean in the next storm, etc.). At intersections, measure the gutter longitudinally through the intersection; do not measure around the corner radius. Short sections of monolithic barrier (such as a 4-foot wide by 50-foot long concrete median island) will not be included in this inventory.

Examples: Gutters Blocked

Example: Curb & Gutter - Monolithic Island or Median

DRAINAGE

Three drainage features will be rated: crossline pipes, gutters, and inlets. For each feature, two measurements will be recorded.

Except for gutters, the total number of drainage features in the segment will be noted as the Total Segment Inventory. Then, the number of these features that do not meet the threshold condition will be recorded as the Measured Amount. For gutters, the total longitudinal length of gutter in the segment will be recorded as the Total Segment Inventory. Next, the length of gutters exceeding the threshold conditions will be recorded as the Measured Amount.

Inlets (Drop Inlets, Catch Basins, Shoulder Drains, Funnel Drains, etc.)

Inlets Blocked:

Feature Description: Inlets are the openings through which water enters an underground drainage network. They can be found in curbs, ditches, valley gutter, and at other locations that are designed to collect water runoff. Examples of inlets are catch basins, drop inlets, shoulder drains, and slope flumes. If the inlet is blocked, water ponding may occur at the obstructed opening. This can result in scour and erosion at an off-road structure, or vehicle hydroplaning if adjacent to the travelway.

Threshold Condition: Grates, Outlets, and Inlets that are **50% blocked** or more should be noted.

Inlets Damaged:

Feature Description: If the structure is damaged, water can penetrate the base and weaken the roadway. Also, a damaged or missing grate is a safety hazard to motorists, bicyclists, and pedestrians.

Threshold Condition: Inlets that are **damaged** or that have **missing or broken grates** should be noted.

- No eroded area within 1’ of the structure that is greater than 6” deep or below the base elevation of the concrete apron.
- Inlets and Outlets are not damaged and are functioning properly.
- Grates are present and not broken

Total Inventory: The total number of inlets in the segment will be recorded.

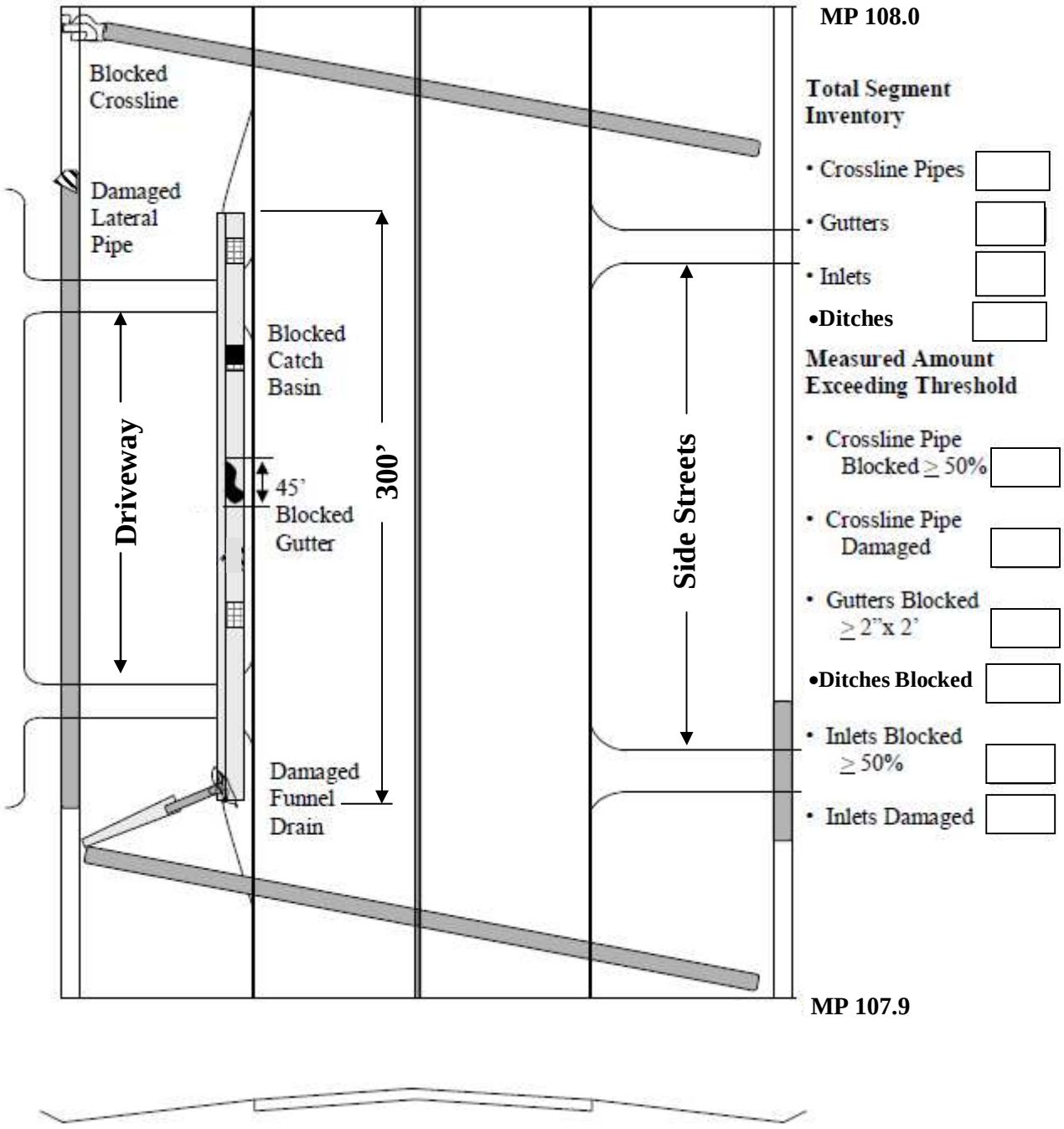
Measured Amount: Each inlet in the segment is to be evaluated. On the ArcPad form, record the number that exceeds or meets the above listed criteria for both blocked and damaged.

Special Instructions: For the Inlets that are located along the shoulders or median, do NOT fail if the inlet is ONLY covered by a thin layer of grass / mowing clippings that will more than likely be blown off or washed away when the next rain occurs.

Examples: Inlets Blocked

Examples: Inlets Damaged / Missing

Example: Drainage — Curb & Gutter, Inlets, Crossline Pipes



Example: Drainage — Crossline Pipe under Side Street

Brush and Tree Control

Feature Description: Brush and tree control involves the removal of large vegetation for safety reasons, to maintain a roadway clear zone, and to provide adequate sight distance. Although trees are an appealing roadside feature, the presence of large trees in the recovery area can be a hazard to errant motorists. A tree canopy can also be a problem if it restricts the visibility of traffic control devices (traffic signals or signs), reduces the stopping sight distance of drivers travelling the road, or limits the sight distance of drivers entering the roadway.

Threshold Condition: Freeways: No Brush & Tree present for a distance of 45' from travel way, 5' behind guardrail, or blocking signs.
Freeways are defined as a route with a controlled access fence.
Non-Freeways: Vertical clearance of 15' over roadway or 10' back of ditch centerline or shoulder point. 5' behind guardrail.

Total Segment Inventory: Where ever you have turf present within the random section, you will also have Brush & Tree Inventory, regardless if there is only grass visible with no other vegetation. For example, if a typical two-lane, two-way roadway is being inspected, the total roadside length will be 1,056 feet (0.1 mi. x 5,280 ft. x 2 shoulders). Median vegetation will not be inventoried or assessed. In that situation the total roadside length will be 1,056 feet (0.1 mi. x 5,280 ft. x 2 shoulders).

Measured Amount: The Measured amount is the longitudinal distances where the brush and tree exceeds or meets the above threshold conditions within the control zone. Enter the sum of these lengths on the assessment form. Each forested / large vegetation piece in the segment is to be evaluated.

Special Instructions: Brush and small trees within the control zone **should not** be noted if they would be mowed in normal mowing operations. However, if the brush and trees are so large that a tractor mower cannot mow them, then their longitudinal length should be measured. An exception is brush and trees that will not be removed due to public sensitivity, such as growth in a residential area. If a tree is beyond the control zone but is a safety concern, it should be measured. When a situation arises such as the presence of a rock cliff adjacent to the roadway or the ROW fence is 8' off the travelway, use judgment and do not count as failure. Vertical clearance of 15' should be evaluated up to the shoulder point NOT just over the travelway.

Examples: Brush and Tree Control

ROADSIDE

Within each sample section, Turf Condition will be evaluated where applicable. Two longitudinal measurements will be recorded: the Total Segment Inventory of the feature and the Measured Amount that the feature exceeds the threshold condition.

Turf Condition

Feature Description: Turf cover is essential to maintaining the stability of unpaved shoulders, slopes, and the ditch line. Without proper vegetation, soil erosion can lead to water infiltration and loss of roadbed support, and even contamination of natural drainage areas due to sediment loss.

Threshold Condition: Areas of **"Brown Out" or Bare or Erodible** turf will be recorded.

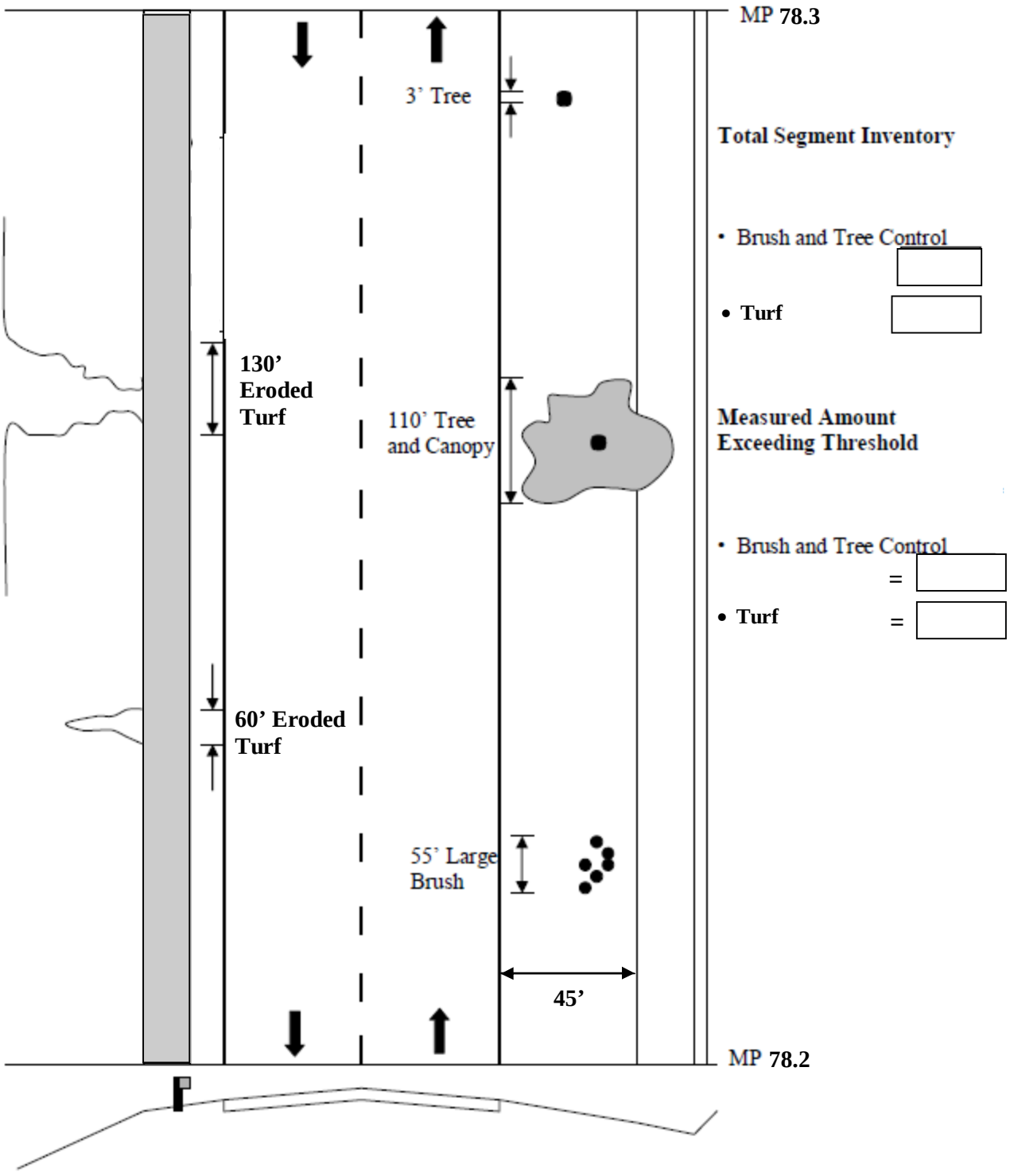
Total Sample Section Inventory: The total roadside length in the Sample Section will be recorded. For example, if a typical two-lane, two-way roadway is being inspected, the total roadside length will be 1,056 feet (0.1 mi. x 5,280 ft. x 2 shoulders). For the assessment of a four-lane roadway divided by a grass median, the total roadside length may be 2,112 feet (0.1 mi. x 5,280 ft. x 4 shoulders).

Measured Amount: Each shoulder, slope, and ditch is to be evaluated. The Measured Amount is the longitudinal length (parallel to the roadway) of any area that has poor turf growth. On the ArcPad form, record the sum of the lengths of poor turf growth.

Special Instructions: Only the condition of turf within the normal mowing limits will be evaluated.

Examples: Turf Condition

Example: Roadside



Pavement Markings / Striping

Feature Description: Pavement Markings are applied to the road surface to convey warnings or information without diverting the driver's attention from the roadway. They consist of center lines that separate traffic traveling in opposite directions, edge lines that provide an edge of pavement guide for drivers, and lane lines that separate traffic traveling in the same direction. When pavement striping is worn or missing, this important traffic control device does not guide and direct motorists as intended, may cause driver confusion, and could even direct motorists into the wrong path.

Threshold Condition: Markings / Striping that have significant portions that are **worn, missing, obliterated, or non-retroreflective** should be noted.

Total Segment Inventory: All Markings / Striping within a section will be collected as Inventory. You will be given a handout with some precalculated inventory amounts for general sections. Use this ONLY as a base amount then add or subtract any other necessary markings.

See handout for Inventory details.

Measured Amount: The measured amount is the longitudinal length where center lines, edge lines, or lane lines do not meet the Threshold Conditions. On the ArcPad form, record the sum of the poor pavement striping.

Special Instructions: Only the marking is to be measured. When recording broken lane lines or center lines, measure the painted marking and not the unpainted gap. For example, if rating a normal broken lane line, measure the 10 foot marking and not the 30 foot gap. The diagonal stripes of painted islands will NOT be assessed. If you calculate the failure amount using a percentage of the total inventory, include the percentage in the comments section on the form. If striping is covered by grass or crack seal, count as failure. If no edge line is present, just centerline, do NOT fail the edge line. This inspection will be done during the day.

Examples: Pavement Striping

Words and Symbols

Feature Description: Words and symbols on the pavement may be used for the purpose of guiding, warning, or regulating traffic. Some examples are Right Turn Arrows, Merge Arrows, Stop Bars, Lane Ends, Crosswalks, School Area Markings, and Railroad Crossing Markings, etc.

Threshold Condition: Word or symbol markings that have significant portions that are **worn, missing, obliterated, or non-retroreflective** should be noted.

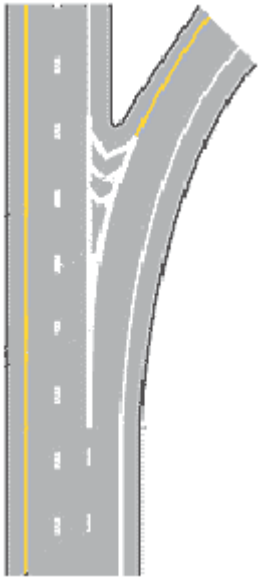
Total Segment Inventory: The total number of word and symbol markings in the segment will be recorded.

Measured Amount: Count the number of words or symbols that are either worn, missing, obliterated, or non-retroreflective, and record on the ArcPad form.

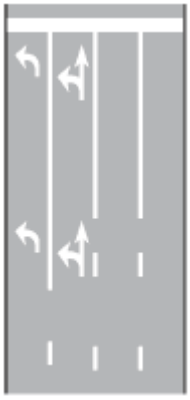
Special Instructions: For two-way left turn lane paired arrows, count as two symbols. Even though individual pavement marking patterns will make up a word (such as an ONLY, a RXR, or a SCHOOL), count the entire pattern as one word. All types of crosswalks (hi-visibility and standard) will count as one symbol. This inspection will be done during the day.

Examples: Failed Words and Symbols

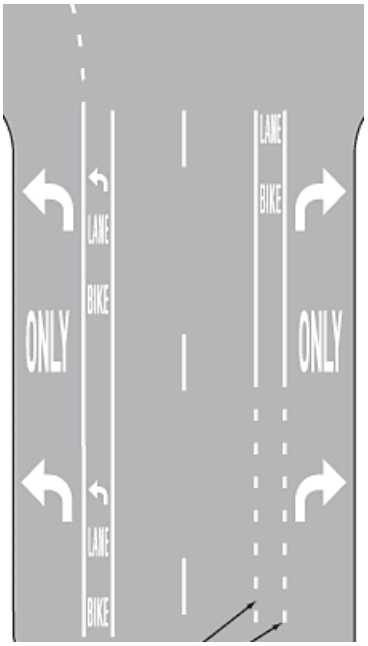
TRAFFIC-WORDS AND SYMBOLDS EXAMPLES



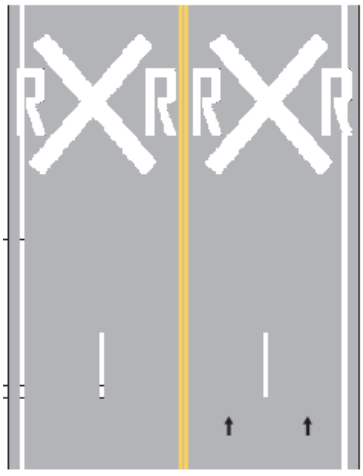
Symbols: 0



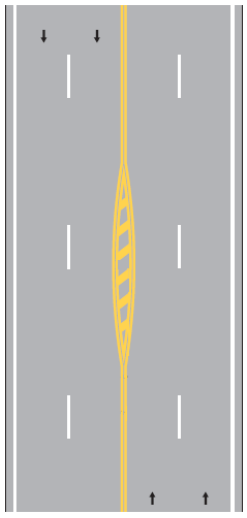
Symbols: 4



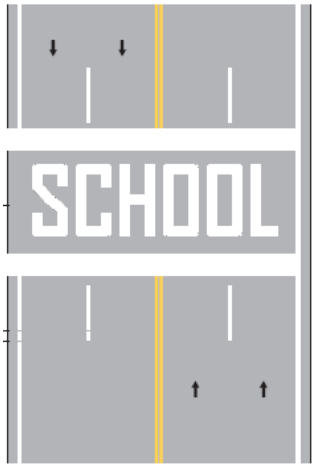
Symbols: 14



Symbols: 2



Symbols: 0



Symbols: 1

Pavement Markers

Feature Description: Pavement markers may be used as positioning guides or to supplement pavement markings. These may be surface-mounted, recessed, or snow plowable. Pavement markers are normally spaced every 80 feet, except in areas of severe road curvature (horizontal curves > 6°) where the spacing is 40 feet. A spacing chart for pavement markers is provided in the NCDOT Roadway Standard Drawings on standard 1250.01, sheet 1 of 3.

Threshold Condition: Pavement markers that are damaged or missing should be noted.

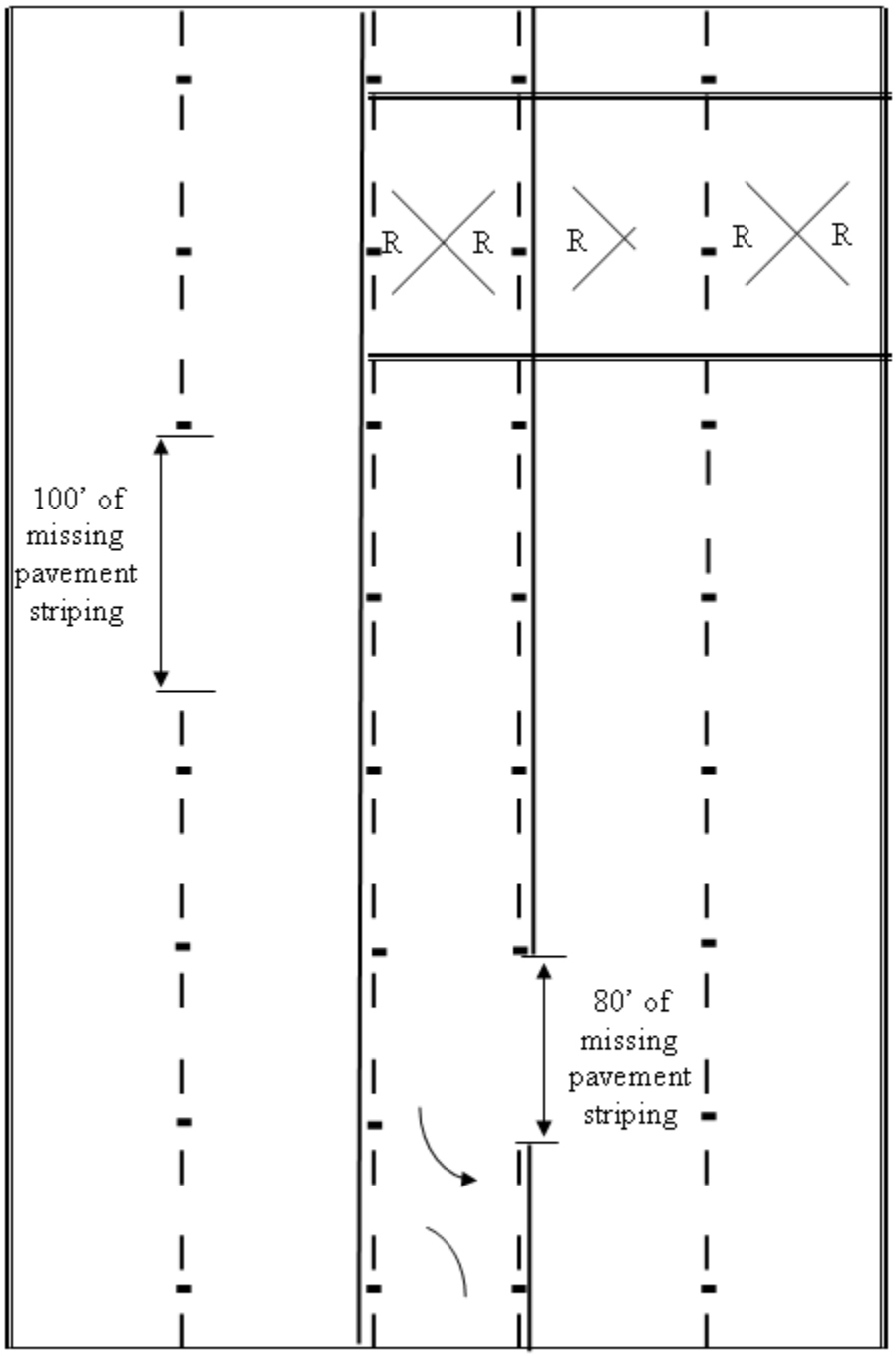
Total Segment Inventory: The total number of pavement markers that should be in the segment will be recorded. For a typical two-lane, two-way roadway, the number of pavement markers will be 7 (0.1 mi. x 5,280 ft / 80ft). If assessing a five lane road (two through lanes each direction with a two way left turn lane), the number of pavement markers will be 28 (4 lane lines x 0.1 mi. x 5,280 ft. / 80 ft.)

Measured Amount: Count the number of pavement markers that are either damaged or missing and record on the ArcPad form.

Special Instructions: Pavement markers will only be assessed on the Interstate and Primary System. If pavement markers have not been installed in the segment being rated, both the Total Segment Inventory and the Measured Amount will be "0". **This inspection will be done during the DAY**

Examples: Pavement Markers

TRAFFIC



Total Segment Inventory

- Pavement Striping
- Symbols
- Pavement Markers

Measured Amount of Feature Exceeding Threshold

- Pavement Striping =
- Symbols
- Pavement Markers

SHOULDERS AND DITCHES

Component Element	Performance Standard	Random Section	Special Instructions	Measurements to be Recorded
Shoulders and Ditches				
Shoulders	1. No dropoffs greater than 3" within 10' of the edge of Travelway 2. No shoulders higher than 2" within 10' of the edge of Travelway.	Random Section	If paved portion is greater then 10' wide or, if concrete gutter is present, then inventory is 0.	• Total shoulder length • Length that does not meet performance standard
Shoulders Cont.	3. No shoulders that cause water to drain back within the Travelway.	Random Section		
Lateral Ditches (Includes Rip Rap and Paved)	1. No more than 50% blocked 2. No erosion greater than 1' below original ditch line	Random Section	None	• Total ditch length • Length that does not meet performance standard

Low Shoulder

High Shoulder

Blocked Ditch

DRAINAGE

Component Element	Performance Standard	Random Section	Special Instructions	Measurements to be Recorded
Drainage				
Crossline Pipes (< 48") (Blocked)	1. Greater than 50% diameter open. 2. No eroded area at the inlet or outlet that is wider or longer than 1.5 times the pipe diameter and greater than 6" deep.	Random Section	Driveway Pipe does not count as a Crossline Pipe. Pipe running under side streets do count as Cross-line.	• Total Inventory within Section • Amount Failed within Section
Crossline Pipes (<48") (Damaged)	1. No damage due to cracking, joint failures, or corro-sion that affects performance / functionality. 2. No water infiltration causing pavement failures, shoulder failures, or roadway settlement.	Random Section	Driveway Pipe does not count as a Crossline Pipe. Pipe running under side streets do count as Cross-line.	• Total Inventory within Section • Amount Failed within Section
Drop Inlets/Catch Basins/ Shoulder Drains/ Funnel Drains/etc. (Blocked)	1. Grates, Box, Outlets, and Inlets that are 50% blocked or more should be noted.	Random Section	Pass/Fail	• Total Inventory within Section • Amount Failed within Section
Drop Inlets/Catch Basins/ Shoulder Drains/ Funnel Drains/etc. (Damaged)	1. Inlets that are damaged or have missing or broken grates should be noted. 2. No eroded area within 1'of the structure that is greater than 6" deep or below the base elevation of the con-crete apron. 3. Inlets and Outlets are not damaged and are function-ing properly 4. Grates are present and not broken.	Random Section	Pass/Fail	• Total Inventory within Section • Amount Failed within Section
Curb & Gutter/ Valley Gutter/ Median Barrier (Blocked)	1. No obstruction greater than 2" deep for a length of 2'	Random Section	Would not be counted if it would not obstruct flow, such as grass growing in a expansion joint	• Total Inventory within Section • Length that does not meet perfor-mance standard

ROADSIDE

Component Element	Performance Standard	Random Section	Special Instructions	Measurements to be Recorded
Roadside				
Brush & Trees	1. **Freeways:** No Trees or woody growth within 45' of travel way, measured along surface of ground (excluding ornamental plantings and guardrail). Ramps to be cleared 10' behind ditch. 2. **Non-Freeways:** Vertical clearance of 15' over roadway, including paved shoulders. 10' back of ditch centerline or shoulder point. 3. No dead trees, or leaning trees that present a hazard. 4. **Freeways:** A clear distance of 5' behind guardrail or concrete barrier (excluding ornamental plantings).	Random Section		• Total length of brush and tree that is present within the Control Zone. • Length that does not meet performance standard • Brush & Small trees within the Control Zone should NOT be noted if they would be mowed in normal mowing operations. • Median Vegetation will NOT be inventoried or Assessed.
Turf Condition	1. No "Brown Out" or bare or eroded areas	Random Section		• Total length of turf condition • Length that does not meet performance standard

TRAFFIC

Component Element	Performance Standard	Random Section	Special Instructions	Measurements to be Recorded
Traffic				
Pavement Striping/Markings	1. Edgelines, centerlines, or skip lines within a section that have significant portions that are worn, missing, obliterated, or non-retroreflective should be noted.	Random Section	• Record: Pass/Fail	• Total Inventory within Section • Amount failed in feet.
Words and Symbols	1. Words or Symbols that have portions that are worn, missing, obliterated, or non-retro reflective should be noted as Failed.	Random Section	• A word is counted as one. • Record: Pass/Fail	• Total Inventory within Section • Amount failed.
Pavement Markers	1. Either Damaged or Missing count as failure.	Random Section	• Record: Pass/Fail • Only on Interstate or Primary System	• Total Inventory within Section • Amount failed.

Comments about the Manual

Please provide Feedback

Thank You!

Important Notes

Tablet PC

Getting Started with the Tablet PC:

(How to utilize the Tablet PC for the Assessment)

Step 1

Power on the Tablet PC by sliding on the Power button located on the front left of the Tablet (Shown below). Once you've powered the Tablet on, unlock the screen by sliding the unlock button located on the front center of the Tablet.

Once you have turned on the Tablet PC and unlocked the screen, you now have two options: **(1)** Leave the screen up and use the Tablet PC like a normal laptop or **(2)** Rotate the screen the push it down to make it more compact as shown below.

Step 2

After you have the Tablet PC unlocked and Powered On, Press:

Control – Alt – Delete (By using either the Keypad or Touchpad).

****If using the touchpad, undock the pen which is located on the left side of the Tablet PC****

Login using the given username and password:

Username: **field**
Password: **DotSrmu1**

Step 3

If the Tablet PC is fully charged, you will be able to use it for just a couple of hours at best. It is recommended that you use the car charger that was also given to you periodically throughout the day.

Inside the Briefcase you were given you should find the car charger along with a wall charger that can be used to charge the Tablet PC over night.

Step 4

1. At the end of the day make sure you have **Saved all your work**!!!
2. Save your files also on the USB Drive as a Back-Up each day as well!!
3. Properly shutdown the Tablet PC (Control-Alt-Delete or Start Menu).
4. If you rotated the monitor make sure you rotate it back to normal.
5. But the Tablet PC and chargers along with GPS contents back in briefcase.
6. Take inside with you…**DO NOT** leave outside!!

Extra

If you have to walk a lot during your assessing, it might be helpful to "undock" the Tablet PC from its docking station. This makes carrying the Tablet PC a little easier by making it lighter.

To "undock" the Tablet PC, simply pull the lever shown in the first picture, while at the same time lifting up the Tablet PC. Too reattach them, gently place the Tablet PC on top of the extended battery and push down.

GPS Device


GlobalSat
BU-353 USB
GPS NAVIGATION RECEIVER
USB Requires No External Power
Waterproof Housing
Built-in Magnet Mount


GPS

Using the GPS Receiver

(Operating Instructions for the **BU-353** GPS Device)

What is a BU-353 GPS Receiver?

A Global Positioning System Receiver that plugs directly into a USB port on the Tablet PC. It then Syncs with ArcPad to show your current location in relation to all surrounding elements and random sections.

How it works:

The **BU-353** is suitable for use in vehicle, marine and aviation navigation, as well as commercial and municipality applications such as fire trucks, police cars, buses, GIS data collection and much more!

With a 6o" cable, placement of the GPS receiver anywhere within the vehicle will usually get sufficient GPS signal reception, but in those rare occurrences when towering high-rises offer challenging satellite reception, simply place the **BU-353** on the vehicle's roof (attaches with its built-in magnet) for improved reception.

Since power and data are transferred through the same USB cable from the **BU-353**, there's no need for batteries or any other external power source.

Step 1

After you turn on the Tablet PC but Before you open your ArcPad files plug the GPS Device into the USB Port on the left hand side of your Tablet PC.

The GPS Receiver has a built in LED light that denotes 1 of 3 things:

LED	Indication	What to do?
Off	GPS Receiver is Off	Make sure GPS is plugged into USB Port, check to make sure connection is good. If still not working try a different USB Port
On (solid)	No Fix, searching for GPS Signals	Turn on ArcPad and make sure on the menu bar that the GPS is set to Active.
On (flashing)	Position fix established and GPS Signals are being Received.	Nothing…Everything is in Sync and ready to begin.

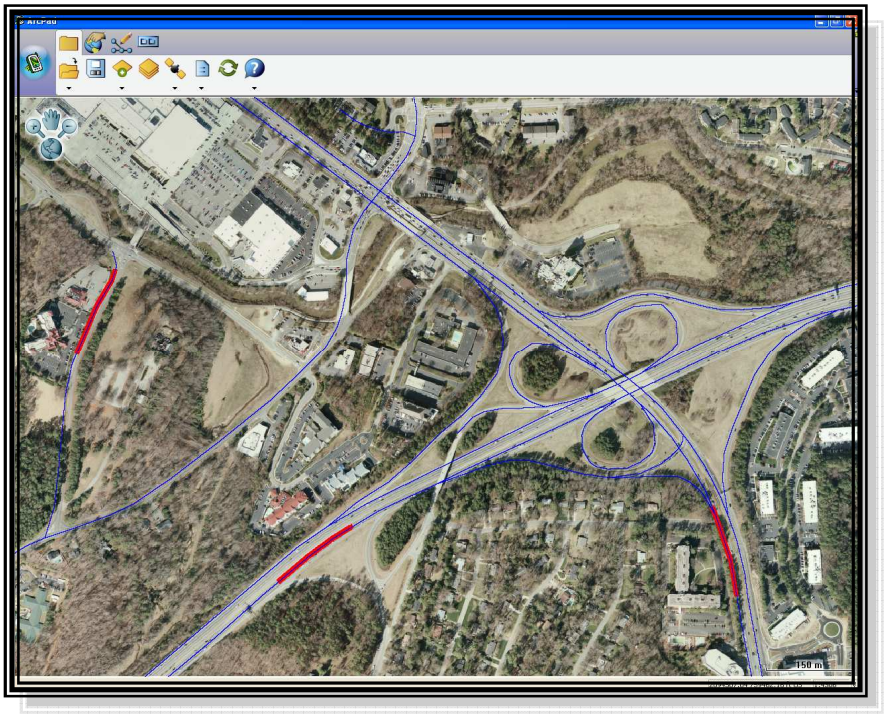
LED Light located at rear of unit.

Step 3

Reminder

- For the GPS Receiver to work properly you need to be outside where satellites can pick up the signal from the receiver.
- If you see a Flashing LED light on the device once you have the Tablet PC on, the GPS Device plugged in, ArcPad Open you are good to go!
- Any other problem that occurs will be from the ArcPad software. See the ArcPad section for details pertaining to GPS connection problems.

ArcPad



What is ArcPad?

ArcPad is software for mobile GIS and field mapping applications that are deployed to handheld and mobile devices. **ArcPad** provides field-based personnel with the ability to capture, analyze, and display geographic information, without the use of paper maps.

What can **ArcPad** do?

- Use existing GIS data
- Capture data in the field
- Query data
- Measure distances
- Navigate with GPS
- Edit data in the Field

Need more information about **ArcPad**?

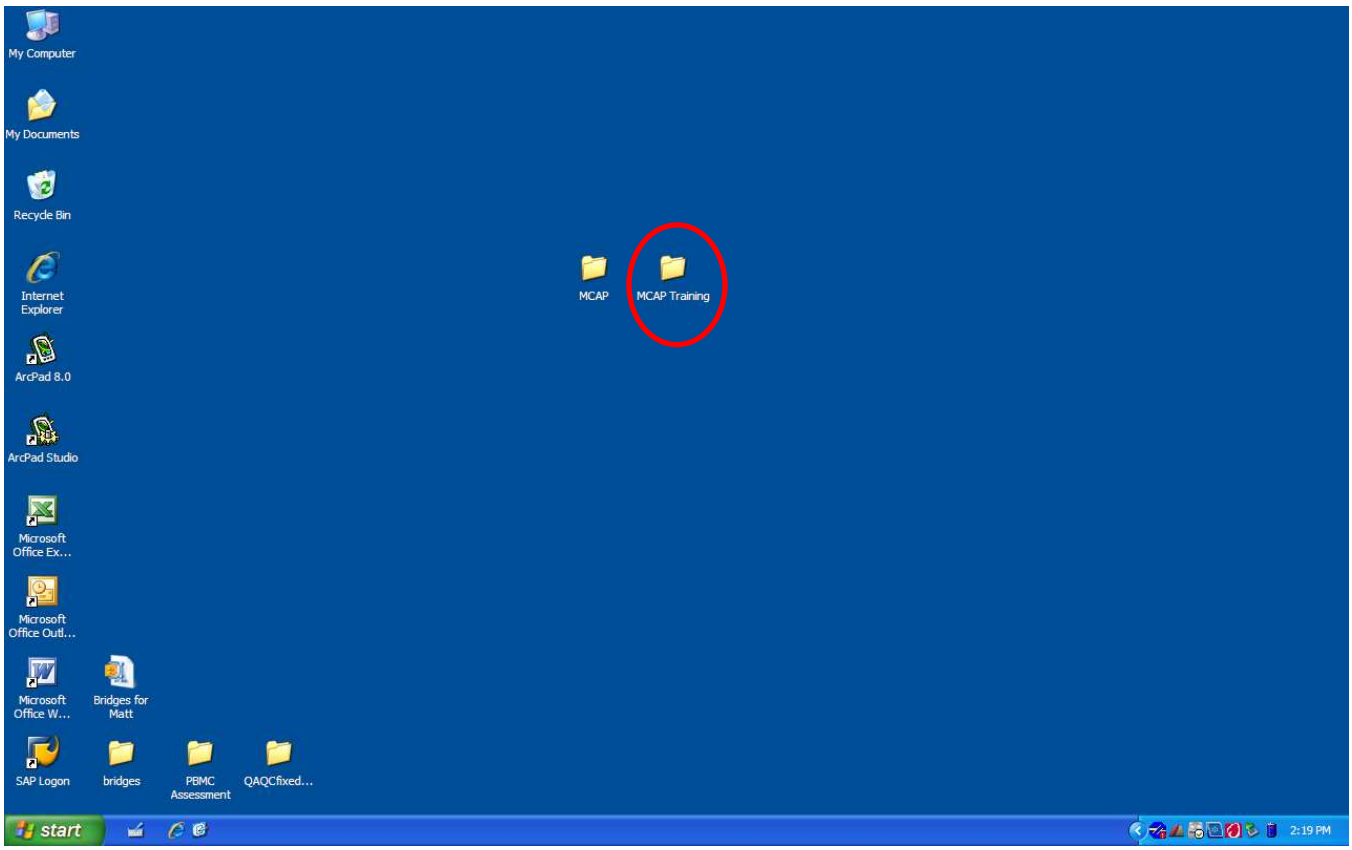
http://www.esri.com/software/arcgis/arcpad/index.html

PART 1: Getting Started in ArcPad

Step 1

Once you have successfully logged onto your Tablet PC, plugged in the GPS, you should see a screen similar to the one below.

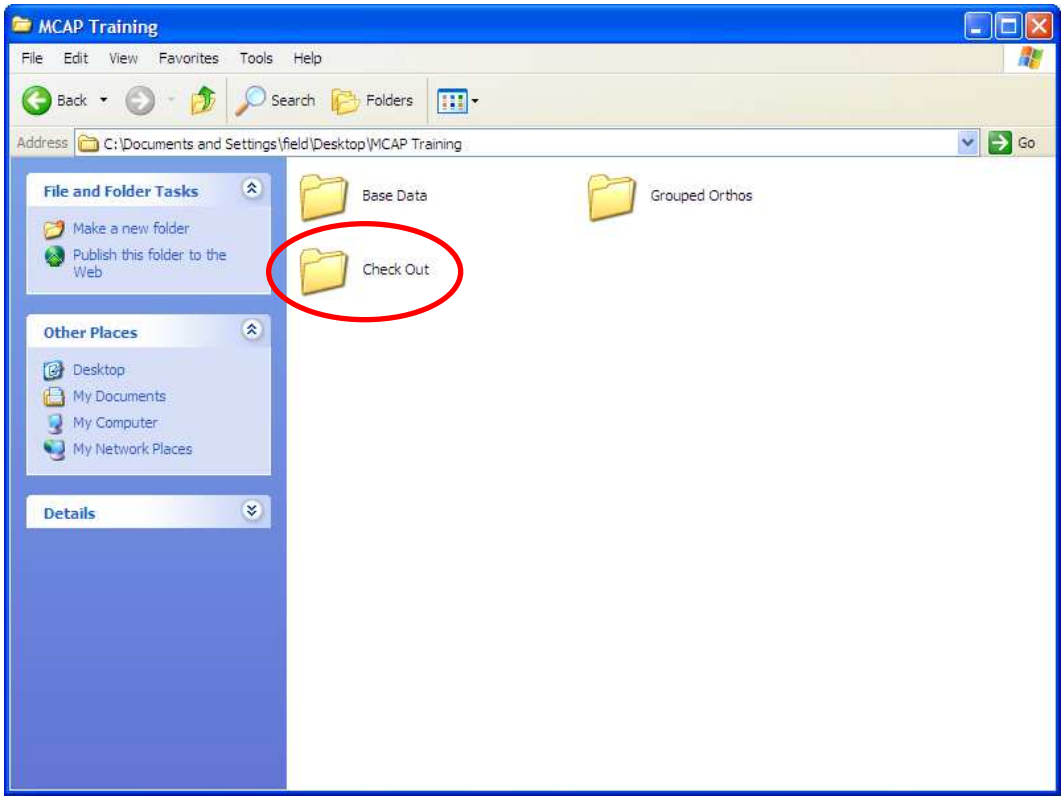
Everything you need for this assessment is located in one folder labeled: "**MCAP.**" For our Training session we'll be using the folder: "**MCAP Training.**"



****Each assessment team will have contents in their "**MCAP**" folder that is specific to their sections. For this Manual and training purposes we have set up a "**MCAP Training**" folder that will function the same way your real assessment data is loaded.****

Step 2

Once you have Double Clicked the "**MCAP Training**"folder, you should see the following:



The only folder we will be concerned with at this point is the "**Check Out**" folder. Double Click the "**Check Out**" folder to proceed.

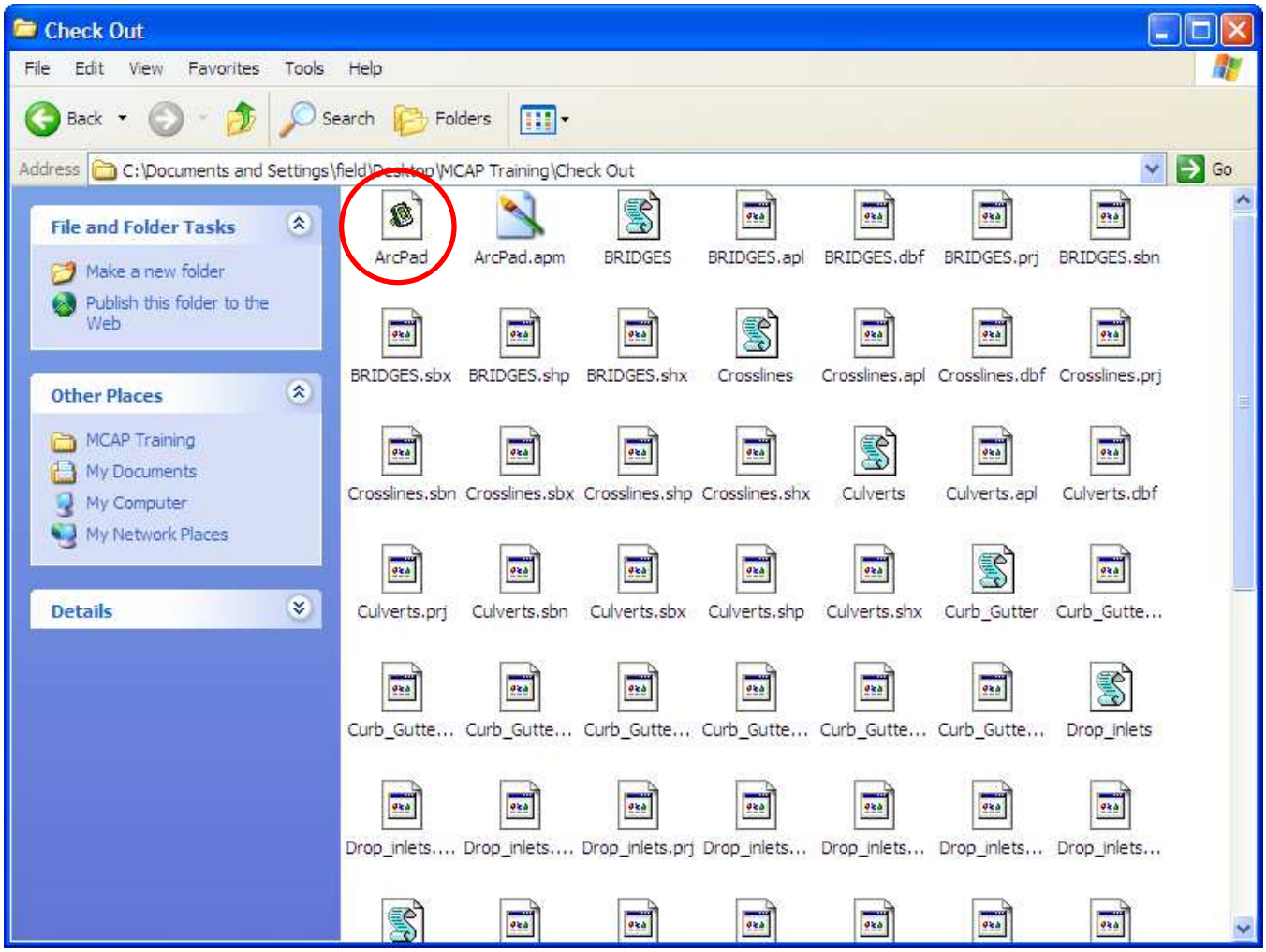
**The "Check Out" folder contains the ArcPad file that you will work on during the duration of the project.

**The "Base Data" folder contains GIS Layers that were used to construct the ArcPad file. You should not need to be concerned with this folder.

**The "Grouped Orthos" folder contains all the aerial imagery that has already been loaded into the ArcPad file. You should not need to be concerned with this folder.

Step 3

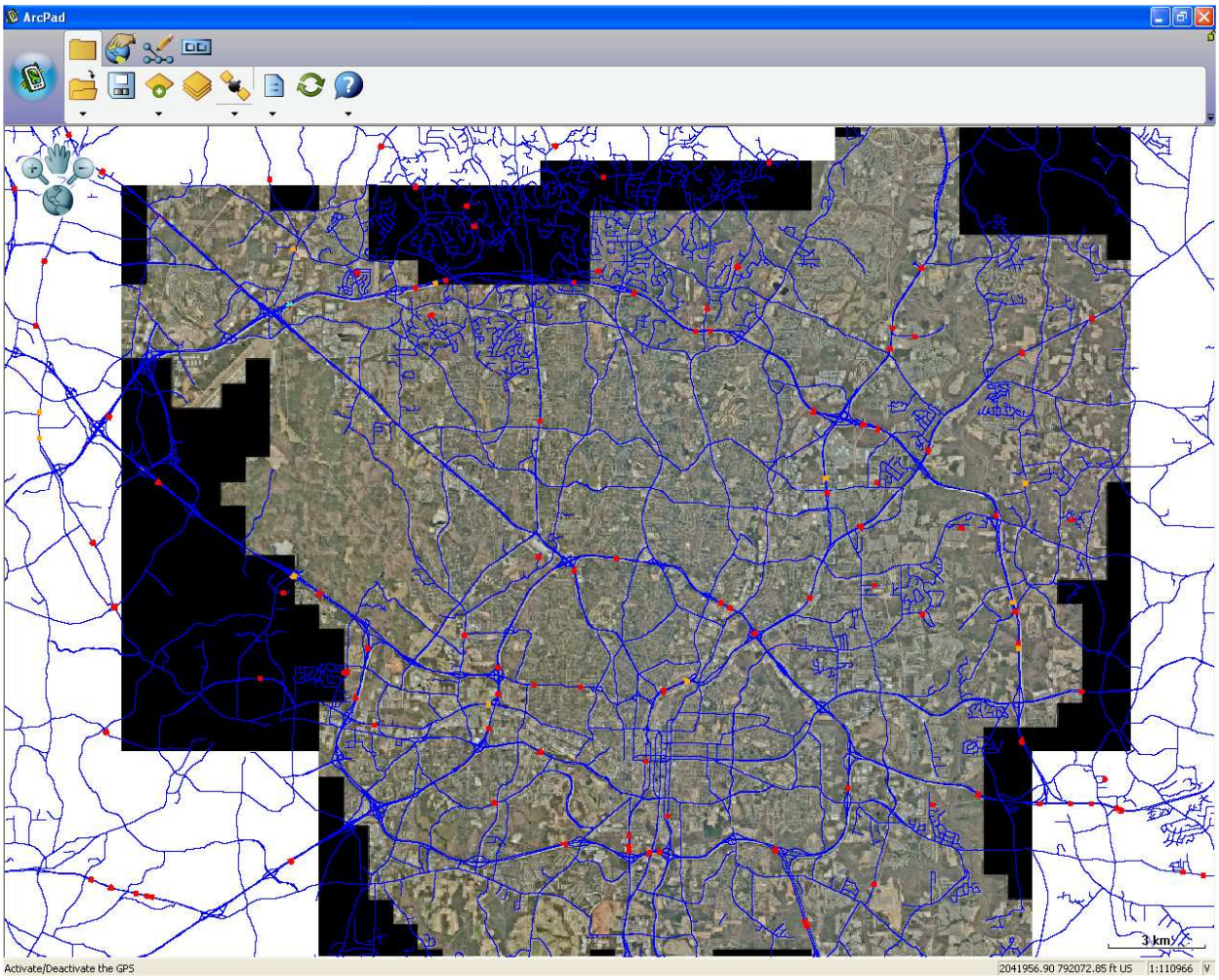
Once you have opened the "**Check Out**" folder you would see the following:



The only file you will use is the "**ArcPad**" file. It can usually be found in the upper left corner in thumbnail format, or if in list format it will be the very first file listed. Double Click the "**ArcPad**" file to proceed.

Step 4

Once you have opened the "**ArcPad**" file, you should see a screen similar to the following:



****You may need to Zoom Out to see your boundaries along with the full extent of your assessment area. To achieve this: Click the "Earth" icon located in the upper left corner of the main screen.
****

You have now opened the ArcPad software which has already been created and loaded with your specific files. You are now ready to start assessing your section!

End of PART 1

PART 2: Navigating ArcPad In Detail

(What you need to know to Successfully Assess)

Main Menu Items:

Activate/Deactivate the GPS

Center map to current GPS position

Go back to previous extent

Go to next extent

GPS Preferences

Save the current map

Start/Stop feature editing

Table of Contents

Identify the feature

Select features

Edit feature properties

Measure distance on the map

Rotate map

Refresh the map

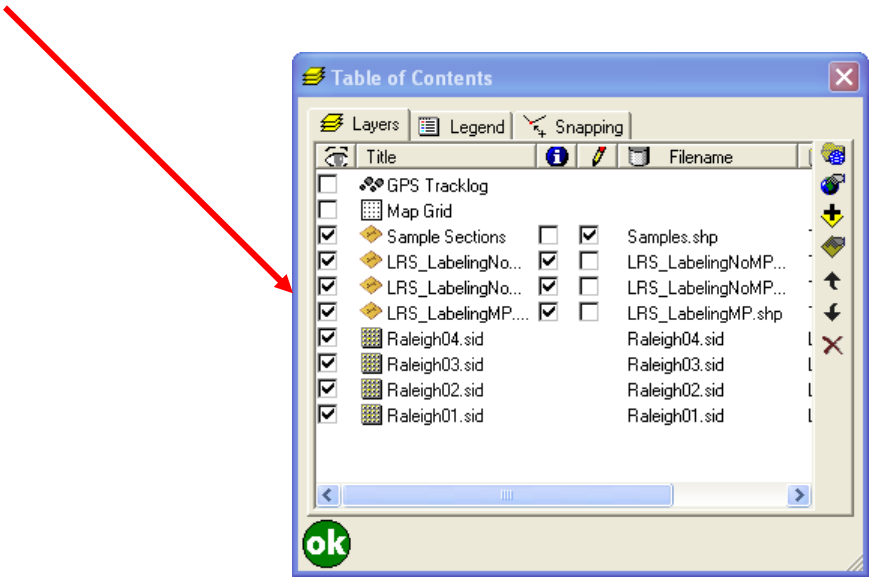
Automatic map rotation

****As previously mentioned, you may need to Zoom Out to see your boundaries along with the full extent of your assessment area. **However**, you will need to Zoom In closer to see every segment that needs to be assessed on the map. This is done by using the Zoom tool which is located right below the Main Menu. The 4 different Zoom tools are:

If using Zoom In or Zoom Out, clicking on the screen will not work. You will need to click and drag to make a box around the area you wish to view.

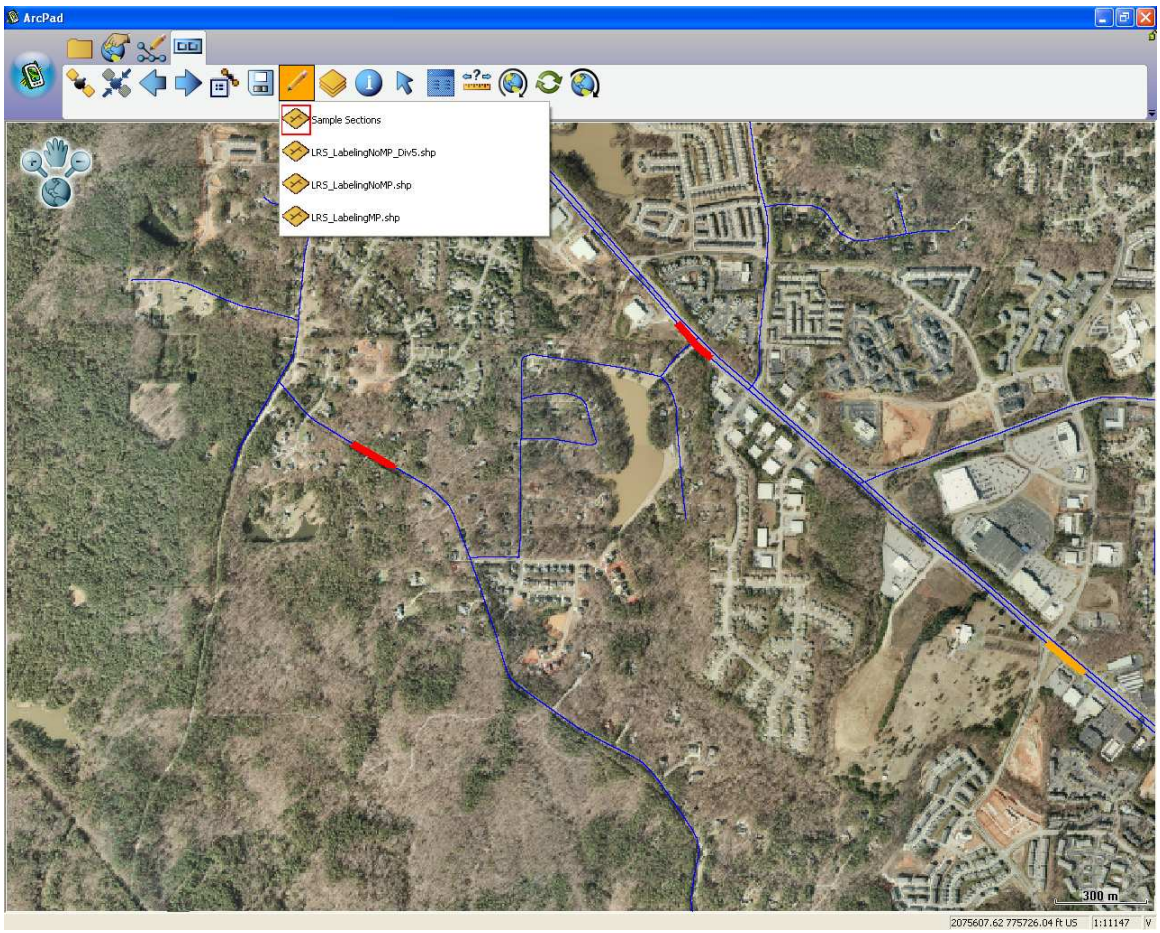
Step 1

To make sure your Sample Sections are Visible and Selectable open your Table of Contents and place a check on them if they are not already. This goes for your Ortho/sid files and your LRS Linework as well.



Step 2

After opening and checking your Table of Contents, you will need to go to the Main Menu and select your Start/Stop Editing Feature Tool . This will open a drop down menu listing 4 selectable features. The only one you will use is "Sample Sections." Simply select the Shapefile Icon beside the words "Sample Sections" and you will see a red box appear around it. If there is already a red box around it, you do not need to click it again. Clicking it again will unselect it. Example: In the screen shot below, the Sample Sections has been selected and is ready to be edited.

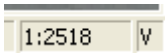


Step 3

You are now ready to drive / navigate to the Sample Sections so you can begin Assessing!

If you see this symbol:  **on your screen then your GPS Receiver is working perfectly and is synced with the Tablet PC and ArcPad. It has pinned down your exact location and is ready to be used as your navigational tool to help you find the exact locations of all your items that need to be assessed.**

This GPS is not like a Garmin or Tom-Tom. It will NOT tell you turn by turn where to go to your Sample Sections, it simply points out your location in reference to where the Sample Sections are located.

As mentioned on Page 17 and shown below, you will need to use the Zoom Tools to get in close to know when you are exactly are at the beginning and end of a Sample Section. You may want to zoom in relatively close so you can see a few Sample Sections at a time. This way you will know when you are approaching the next one so you can have plenty of time to slow down and find a good place to pull off the road and assess it. A good scale to use is 1:700 once you've gotten close to one of the Sample Sections. While you are driving you may want to zoom out to about 1:5000 or even further out, the choice is yours. To see the scale you will need to look in the lower left corner of the screen: 

****You **Can Not** zoom in on another part of the screen that doesn't include your current location. This is due to the fact that the screen moves along with the GPS and always keeps it located centrally.

Step 4

At this Point:

1. **The Tablet PC is on,**
2. **The GPS is Plugged in and Active,**
3. **You've opened your ArcPad File,**
4. **You've Setup it to make the Sample Sections selectable,**
5. **You've Zoomed to a comfortable level so that you can see your current location in relation to Sample Sections.**

Now, you need to proceed to one of the Samples.

****Your Sample Sections that need to be assessed will be shown in RED. Each one starts out RED and during the assessment becomes either GREEN or BLACK. The colors represent the following:**

RED = Incomplete / NOT Assessed
GREEN = Successfully Assessed
BLACK = Section Skipped

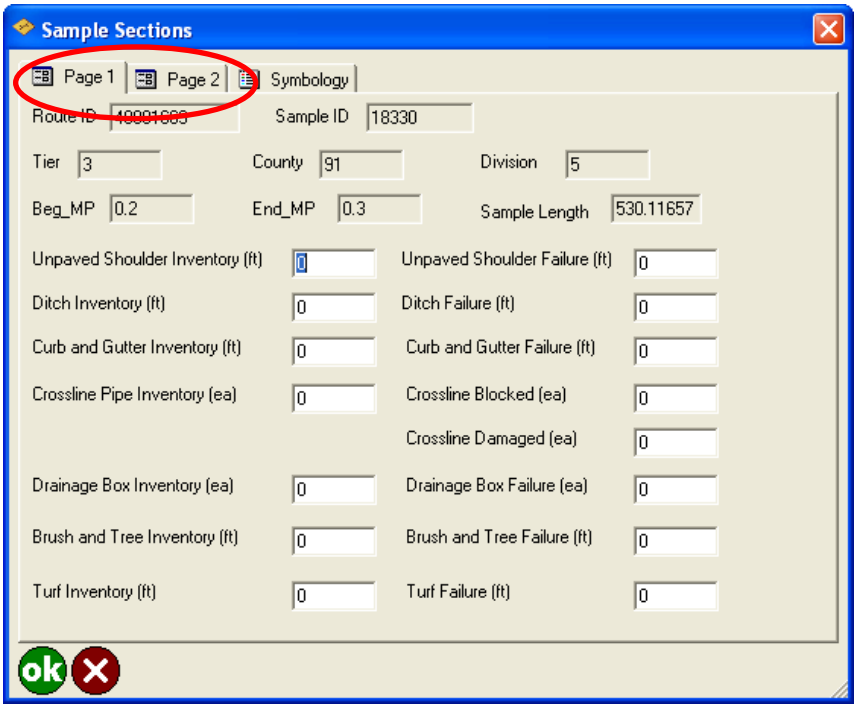
After you've selected  **(Start / Stop Editing Feature tool) you will then need to go back to the Main Menu and Select**  **. This tool is your Selection tool that you will use to double click on the Sample Section, which will open it up for editing.**

IMPORTANT****IMPORTANT******IMPORTANT******IMPORTANT**

******Reminder: When you are assessing the random segments you are responsible for assessing both sides of the Route!! You are also responsible for assessing the median. The random segments are not completely assessed until this is done.******

******Past MCAP Assessments required that you come back out at night to assess the markers and symbol, This is no longer necessary. All Assessing will be done during the Day.******

If you arrive at a Sample Section, you need **to *Double Click*** the Red (Unassessed) Section with either the pen or with the mouse. This will open the following window:

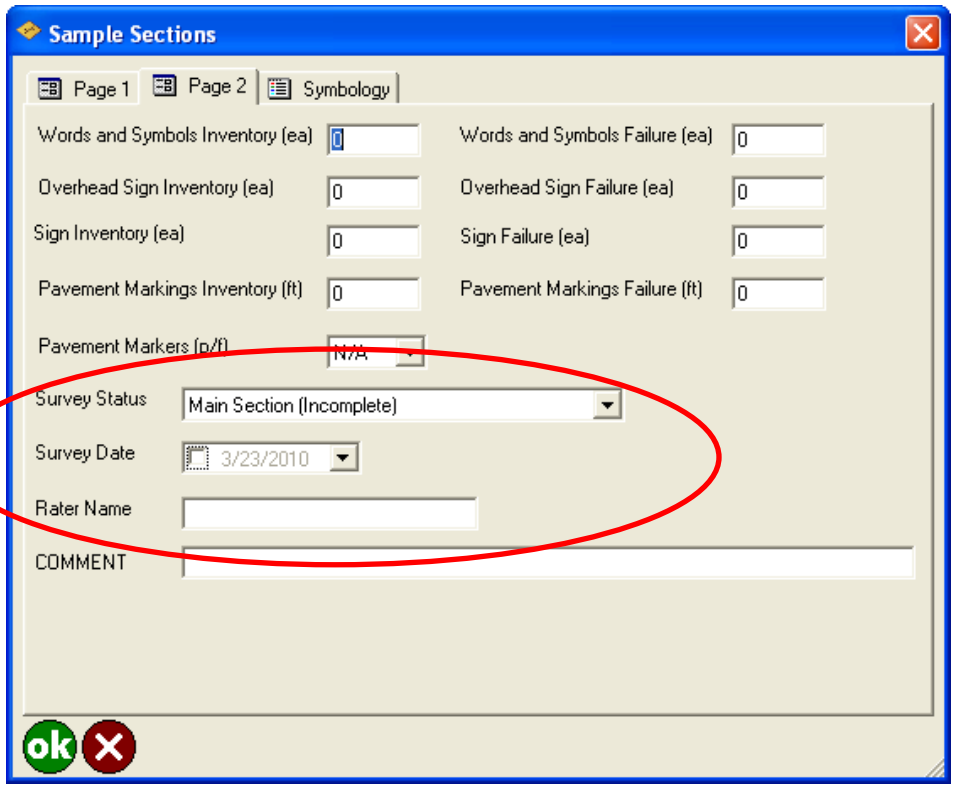


You are looking at the criteria that needs to be looked at when assessing a Sample Section. You will notice near the top of the window, there are 2 tabs labeled: **Page 1 and Page 2**. Each of the pages has specific criteria that needs to be addressed line item by line item. Not all line items will be applicable, so you might leave some blank or N/A.

Flip to the Elements / Features section in this Manual for guidelines on what classifies as passing and failing.

When you have gone line item by line item through both Pages and assessed everything, you need to make sure you have changed the "Survey Status" on Page 2 to **Assessment Complete** in the drop down box. Also you need to Click beside the date so that a check mark appears and type in the rater's name below it.

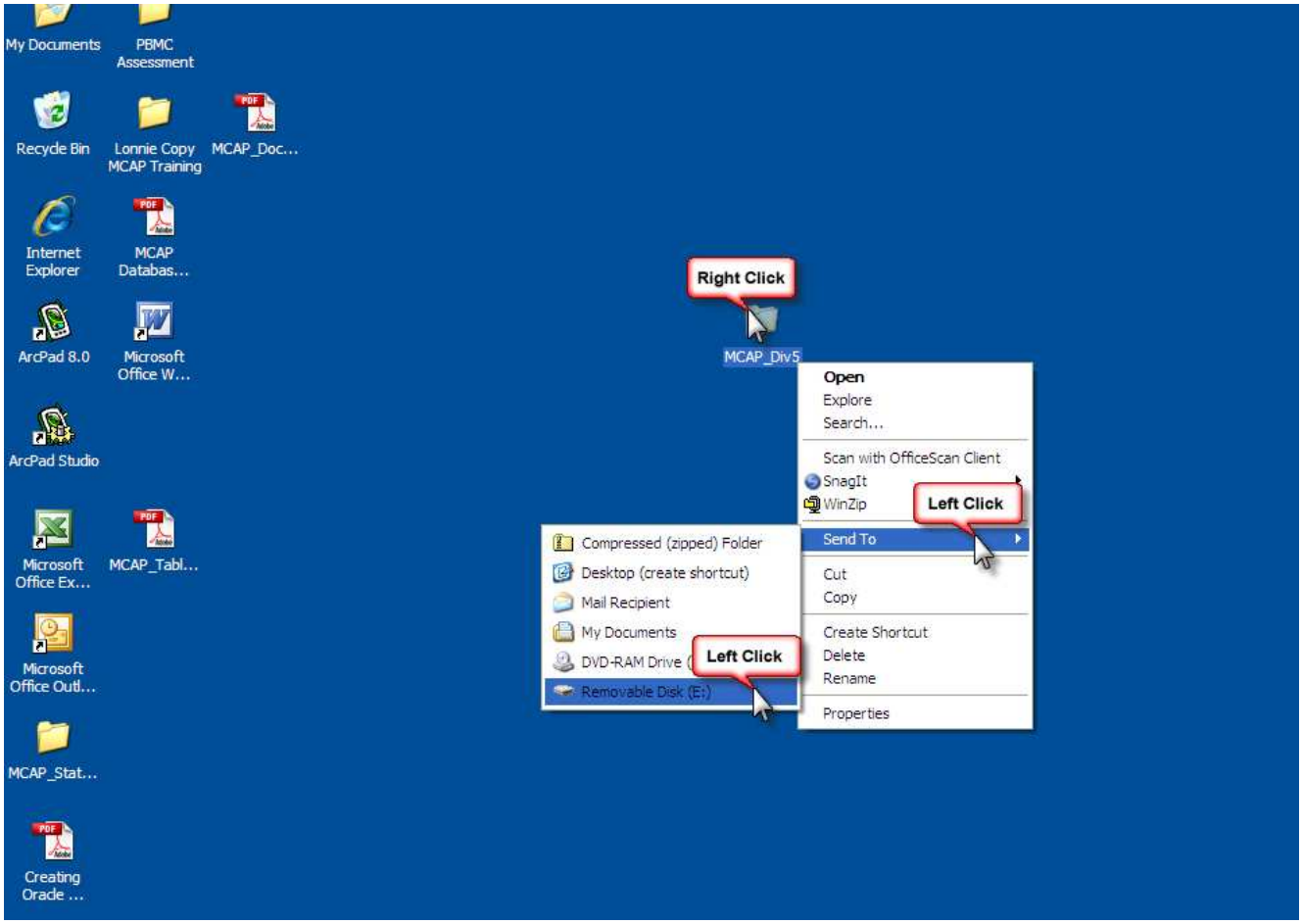
Lastly, click the Green ok in the lower left corner of the window to close it. This indicates to ArcPad that the given Sample Section has been assessed. You should now see the section turn from Red to Green. If you click the ✕ then your edits will NOT be saved!



When you have completed work for the day and you've checked to make sure all your sections are showing in Green instead of Red. Go ahead and Click the Earth Icon to Zoom out to full extent. Next, hit the Save Icon one more time. Now you can click the Red "X" in the upper right corner to exit out of ArcPad. You can now close your MCAP_DivX folder as well.

IMPORTANT****IMPORTANT******IMPORTANT******IMPORTANT**

To Save: Right click on the "MCAP_DivX" folder and send to your USB Drive (Removable Drive E) as shown below. If prompted that there is already a folder on the USB Drive that is named "MCAP_DivX," click "yes to all" to Over-Ride the existing file.



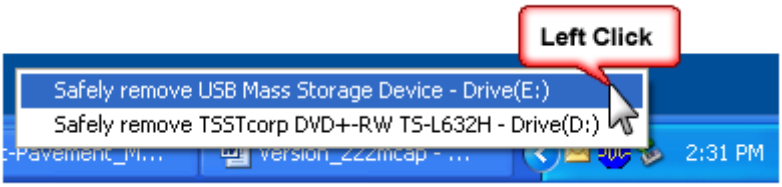
At the end of the day, make sure you have saved all your work on both the Hard drive and on the USB flash drive. Next, shut down the Tablet PC and place it along with any items you've pulled out of the PC Case and put back into the PC Case and store the equipment in a safe place. You may want to charge the Tablet overnight but as long as you have the PC car charger, then it is not necessary.

IMPORTANT****IMPORTANT******IMPORTANT******IMPORTANT**

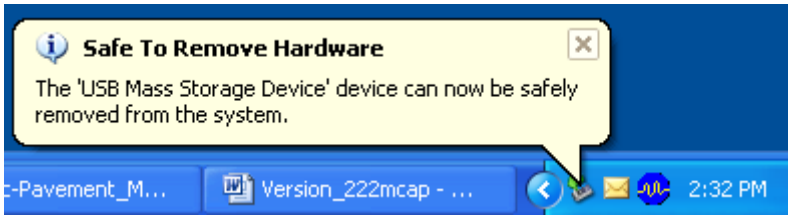
Once you have clicked “yes to all”, you will notice that your USB Flash Drive will blink for a few seconds. Once it has stopped flashing, you can exit out of your “MCAP_DivX” folder and unplug the GPS Unit.

In the lower right corner of the screen you will see a mini USB drive with a green arrow on top. You will need to Left click this Icon.

After you have Left clicked the Icon you will see a window pop up asking which Drive would you like to remove. You will need to select the drive that is labeled “USB Mass Storage Device” and Left Click.



After you have Left clicked the correct USB Drive to Safely remove, you will see the following screen. You should also notice that your USB Flashdrive is no longer lit up Orange. You can now pull out the USB drive from the Tablet PC and hook it back into the bag where you first found it.



You have now successfully backed-up all data!

MCAP Handouts

State Road Maintenance Unit

MCAP – Maintenance Condition Assessment Program

(MNT – 700)

Course Agenda

DAY 1

Welcome & Introduction

Conducting the Assessment

Break

Elements and Conditions

Lunch

Tablet PCs & Data Collection

Break

Field Activity: Section Walk Through

DAY 2

Start at 9:00

Field Activity: Section Assessments

Break

Review of Sections

Additional Instructions

Approx. 12:30 – Go forth and assess!

MCAP 2010

Additional Instructions

1. All time and expenses will be charged to the following WBS elements:

   36065 for the primary system
   36090 for the secondary system
   Work Function 2714 Assessments and Inspections

2. In ArcPad if an "error" pops up stating that "Sign Inventory" is wrong, it is referring to pavement markers. Also, pavement markers are only assessed on the interstate and primary system.

3. Disregard "Overhead Signs" data field in ArcPad. Overhead signs will not be assessed.

4. No elements will be assessed at night.

5. If a section needs to be skipped replace it with an alternate (orange one) within the same county and on the same system except for interstate, it can be replaced with one within the division.

6. Data will need to be uploaded daily for the first week. Then once a week for the remaining assessment period.

7. The QA team will be checking 5% of your sections. They will need to get in touch with you to provided feedback.

8. Survey needs to be completed and all data uploaded by Friday, Sept. 3.

   The QA teams are as follows:

Divisions 1,2,3,4	Contact Number
Wayne Jones	252.459.2128 Ofc
Donald Gray	252.428.8096 Cell

Divisions 5,6,7,8,9	Contact Number
Dennis Carter	
Bruce Jacobs	919.971.7185

Divisions 10,11,12,13,14	Contact Number
Roger Peeler	828.652.3344
Bill Boone	828.652.3344

MCAP 2010

QA Team Meeting

Items to Discuss

1. Cross line pipes: Closed vs open system
   If one end is open and you can look up in the pipe to assess it, that one pipe is a cross line pipe. Pipes that connect boxes are part of a closed system.

2. Ditches in medians: If you have a wooded median and the ditch goes off into the woods, do not inventory it or assess it. If the median is a fill section and the ditch is at the toe of the fill, do not inventory it or assess it.

3. Mowing behind G/R: If you have mowing behind G/R it will not be evaluated as turf. So if the shoulder is paved to the G/R then there would be no inventory for turf for that location.

4. Brush and tree on freeways: If there is no G/R and a ditch is present on a freeway then the threshold condition would be 10 feet back of ditch centerline.

5. Brush and tree on non-freeways: Threshold conditions are 10 feet back of ditch centerline or shoulder point for a fill section.

6. Interstates are assessed at the division level. Therefore there is no county status for interstate in the report and if a section has to be replace it can be anywhere in the division.

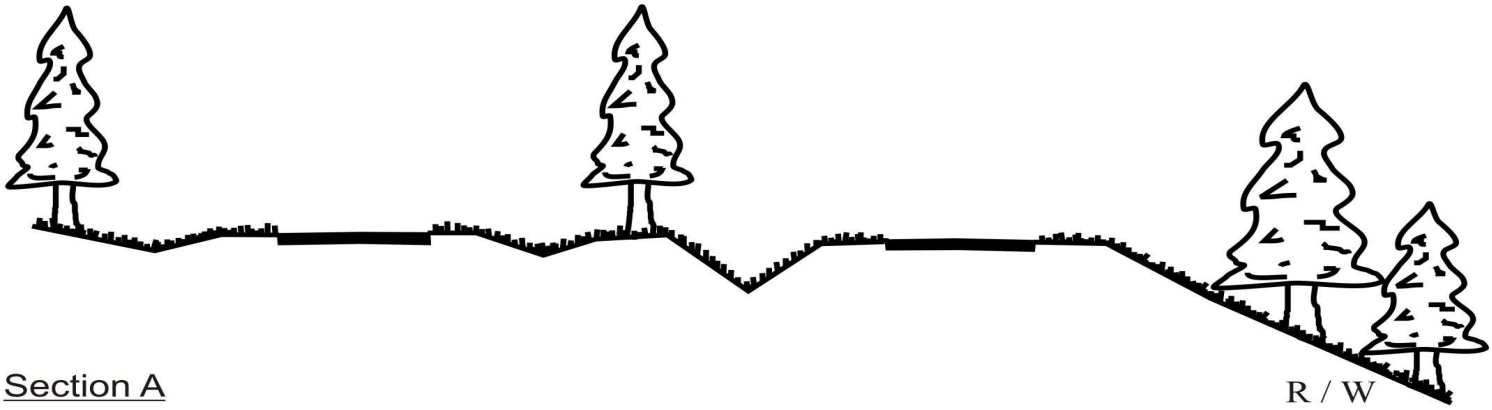
7. Experience with tablets

8. Other issues from the field.

Tablet

Search and sort, etc.

Typical Four Lane Highway Section A



Section A

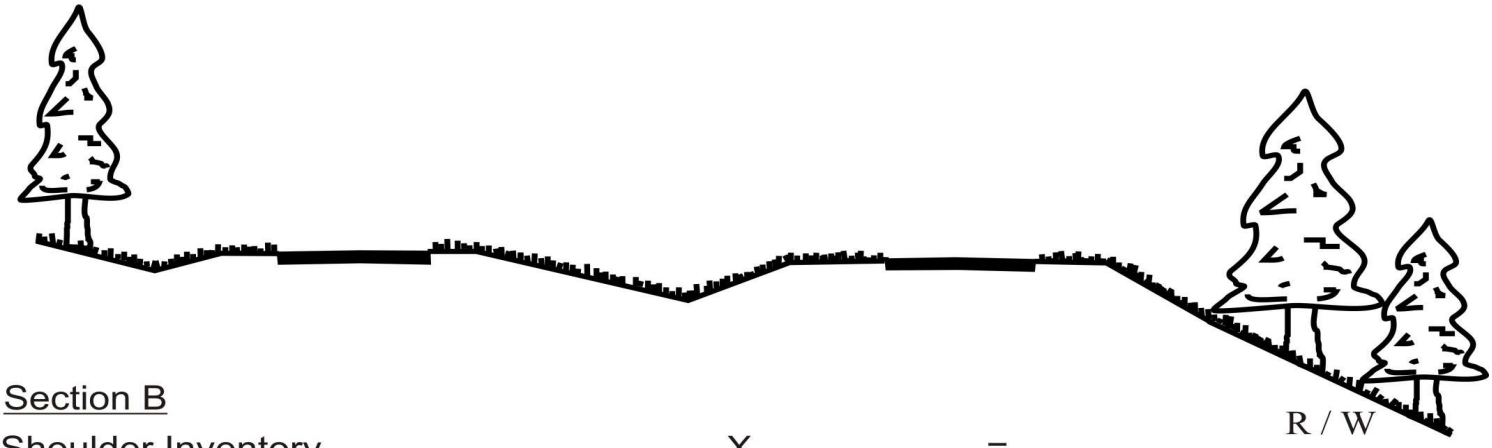
Shoulder Inventory _____ X _____ = _____

Ditch Inventory _____ X _____ = _____

Brush and Tree Inventory _____ X _____ = _____

Turf Condition Inventory _____ X _____ = _____

Typical Four Lane Highway Section B



Section B

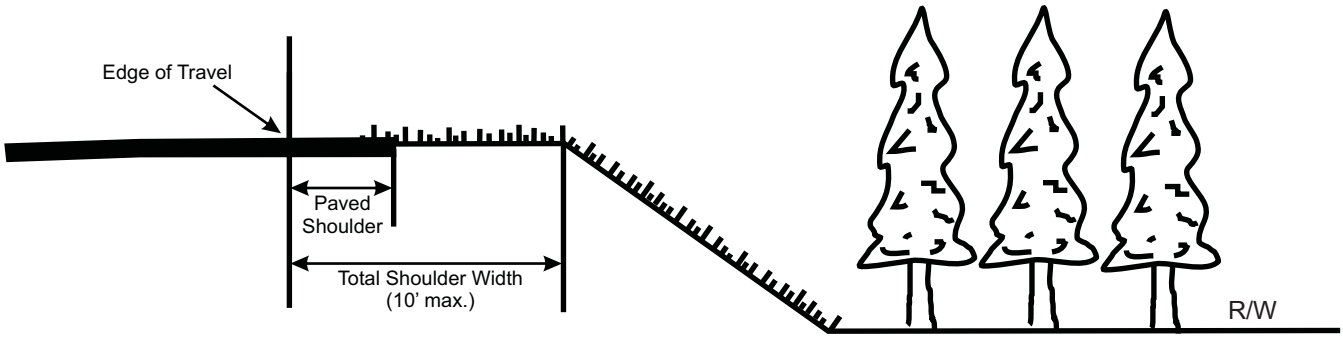
Shoulder Inventory _____ X _____ = _____

Ditch Inventory _____ X _____ = _____

Brush and Tree Inventory _____ X _____ = _____

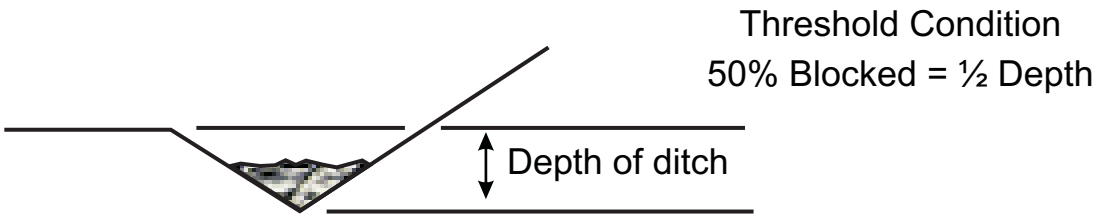
Turf Condition Inventory _____ X _____ = _____

Unpaved and Paved Shoulders

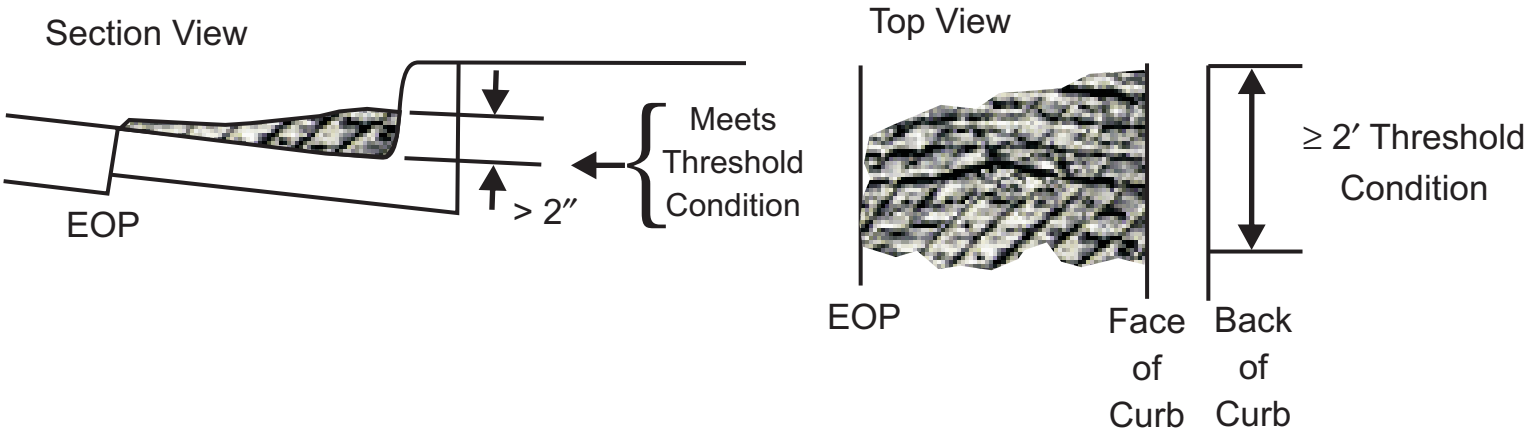


If paved shoulder width is equal to or greater than 10′, then unpaved shoulder inventory is zero (0).
If unpaved shoulder width is any width, up to 10', it will be assessed.

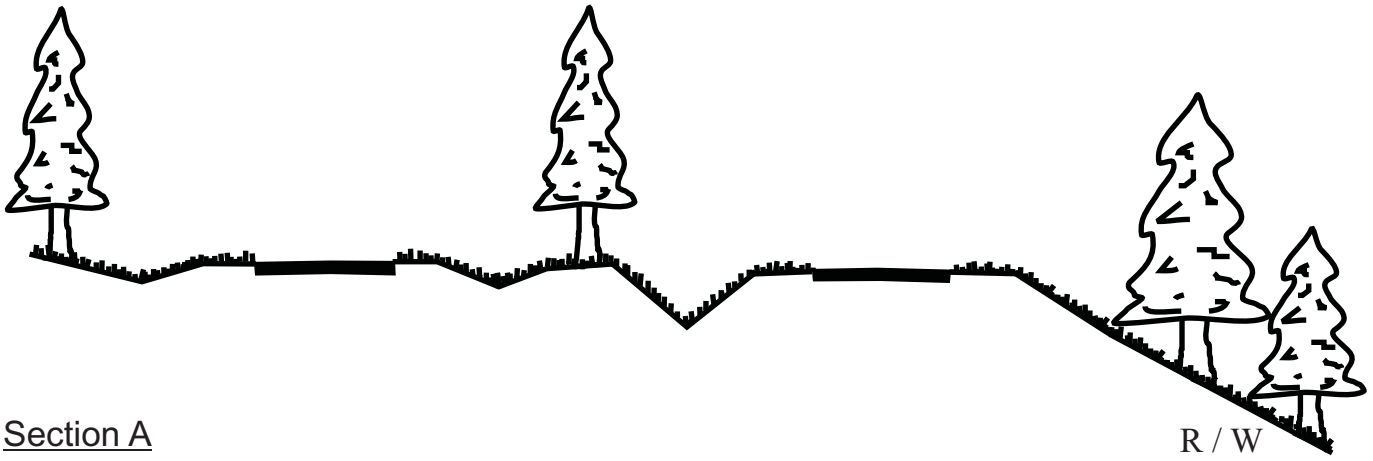
Typical Ditch Section



Typical Curb and Gutter



Typical Four Lane Highway Sections



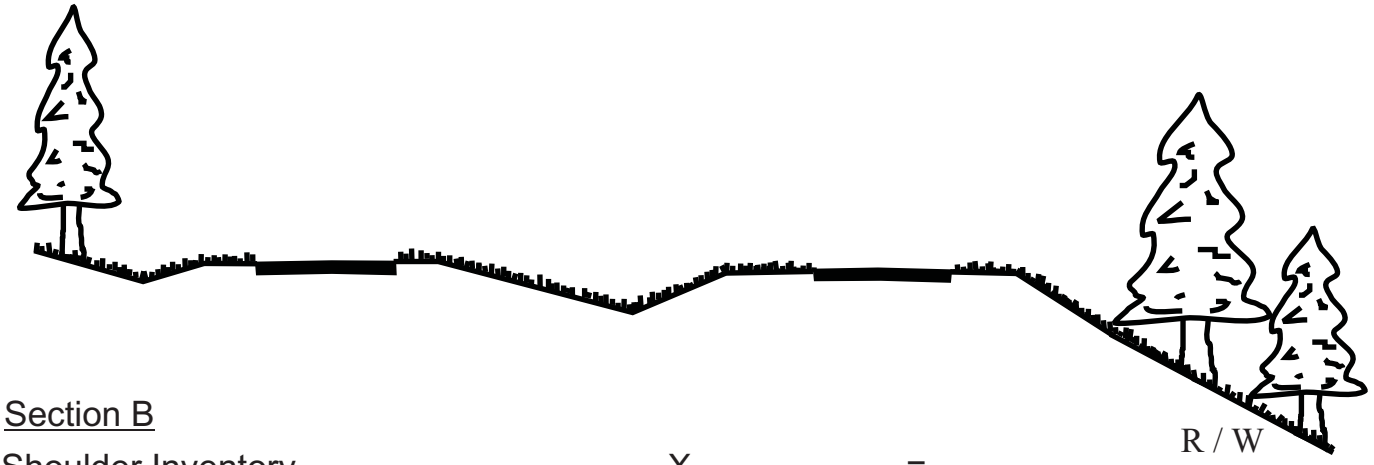
Section A

Shoulder Inventory _____ X _____ = _____

Ditch Inventory _____ X _____ = _____

Brush and Tree Inventory _____ X _____ = _____

Turf Condition Inventory _____ X _____ = _____



Section B

Shoulder Inventory _____ X _____ = _____

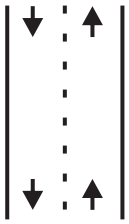
Ditch Inventory _____ X _____ = _____

Brush and Tree Inventory _____ X _____ = _____

Turf Condition Inventory _____ X _____ = _____

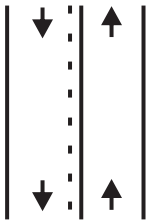
Pavement Marking Inventory for Various Roadway Segments

Road 1



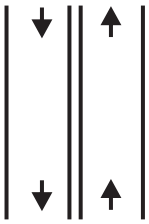
Inv. 1188
Inv. C&G 1 side 660
Inv. C&G both sides 132

Road 2



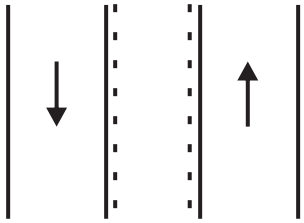
Inv. 1716
Inv. C&G 1 side 1188
Inv. C&G both sides 660

Road 3



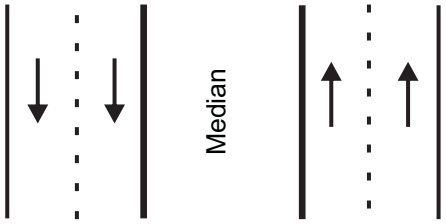
Inv. 2112
Inv. C&G 1 side 1584
Inv. C&G both sides 1056

Road 4



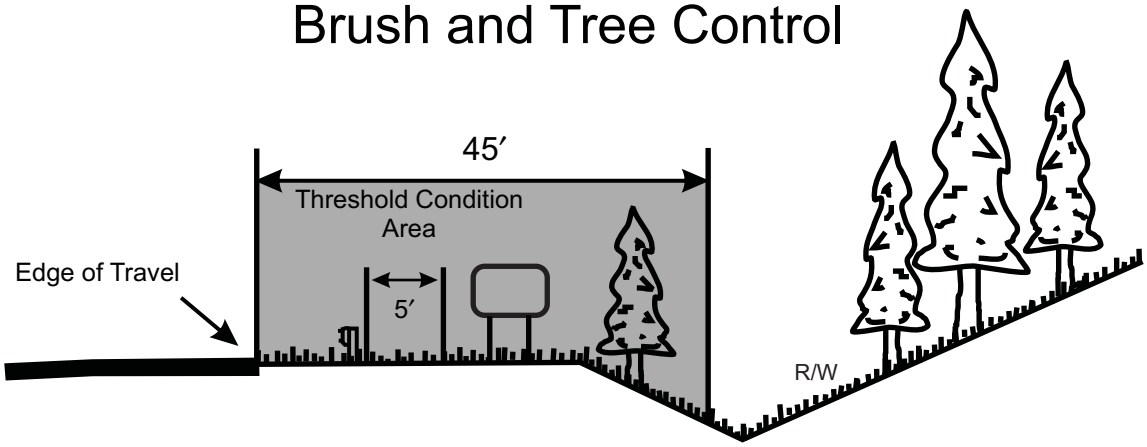
	C&G 1 side	C&G both sides
3 lane 2376	3 lane 1848	3 lane 1320
5 lane 2640	5 lane 2112	5 lane 1584
7 lane 2904	7 lane 2376	7 lane 1848

Road 5
Divided Facilities

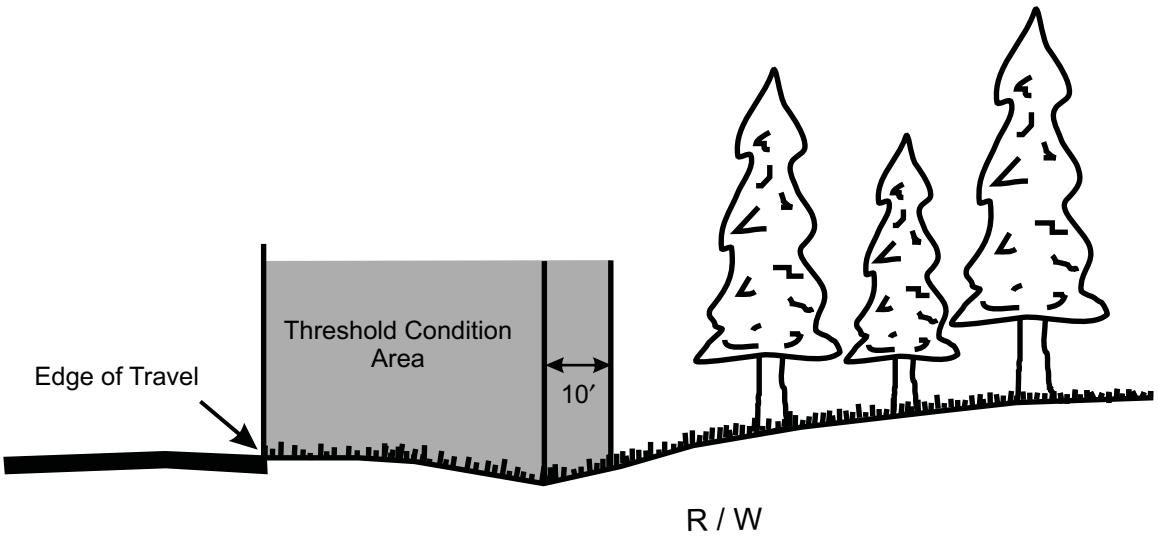


	C&G 1 edge	C&G 2 edges	C&G 3 edges	C&G4 edges
2 lanes 2376	1848	1320	792	264
3 lanes 2640	2112	1584	1056	528
4 lanes 2904	2376	1848	1320	792
5 lanes 3168	2640	2112	1584	1056

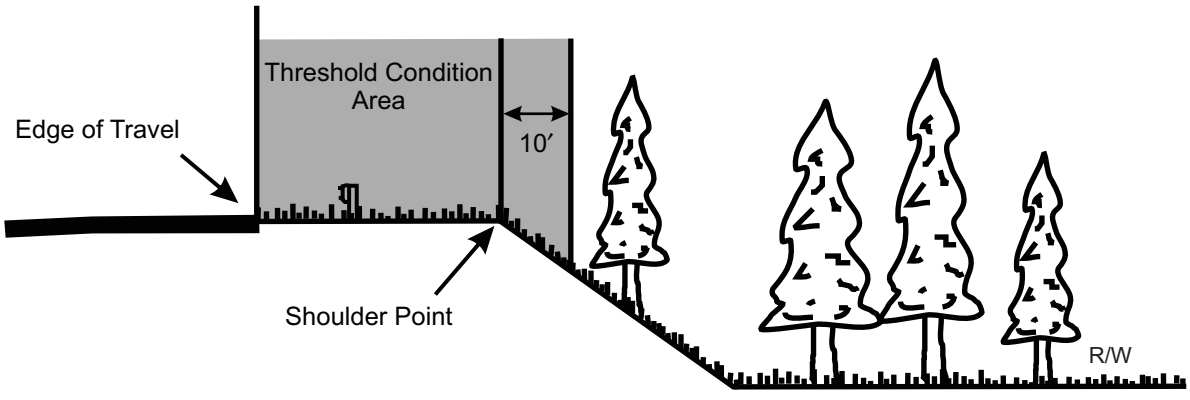
Brush and Tree Control



Freeway Section



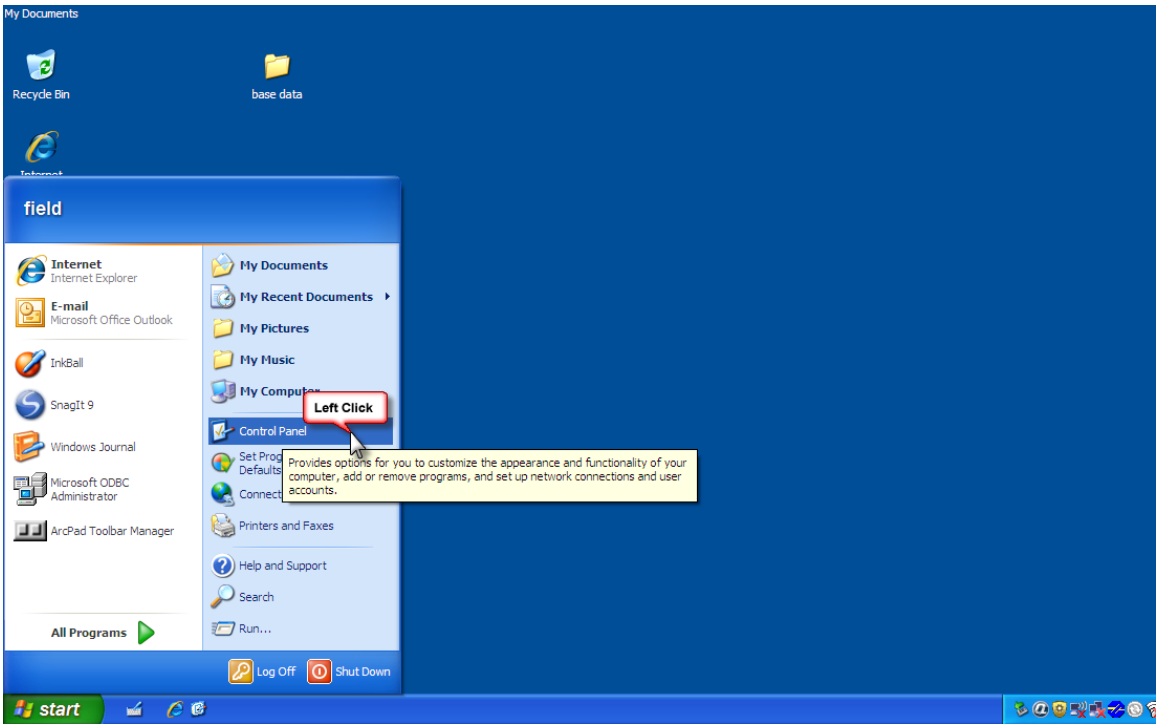
Typical Cut Section



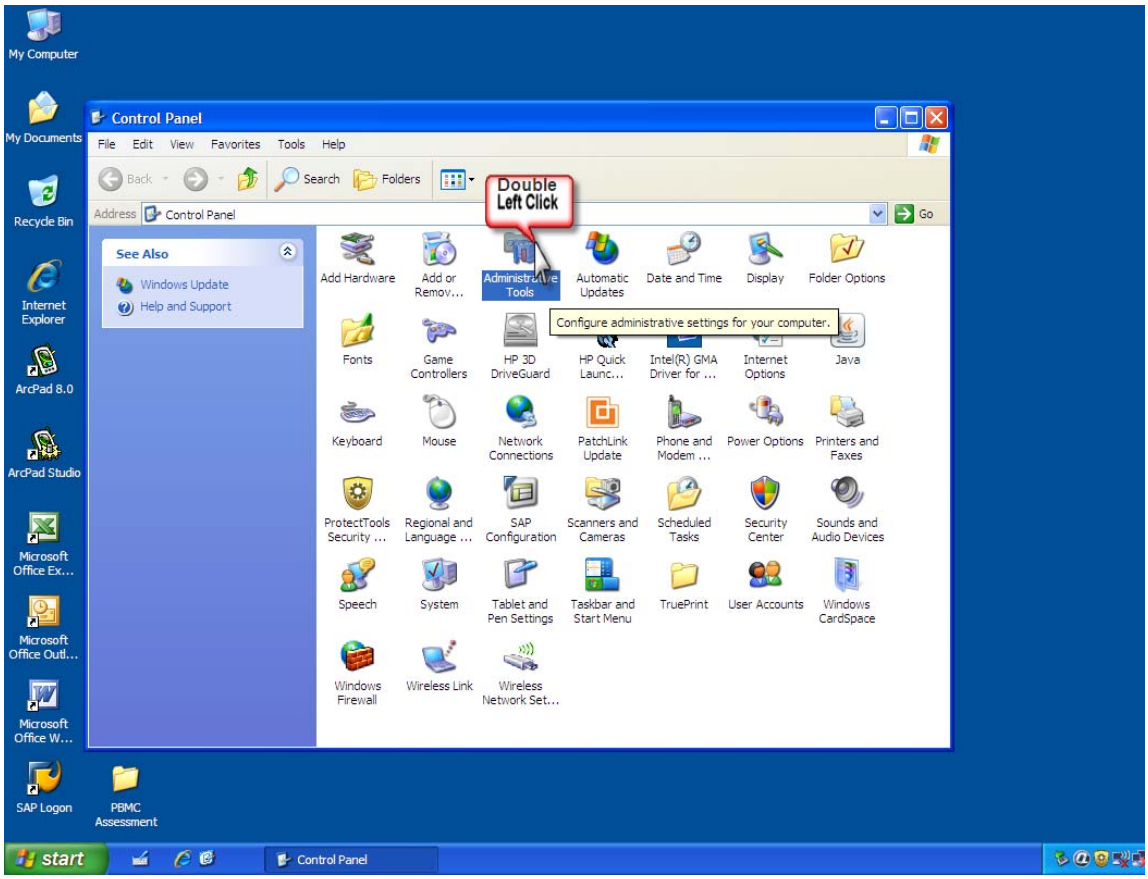
Typical Fill Section

Creating Oracle Database

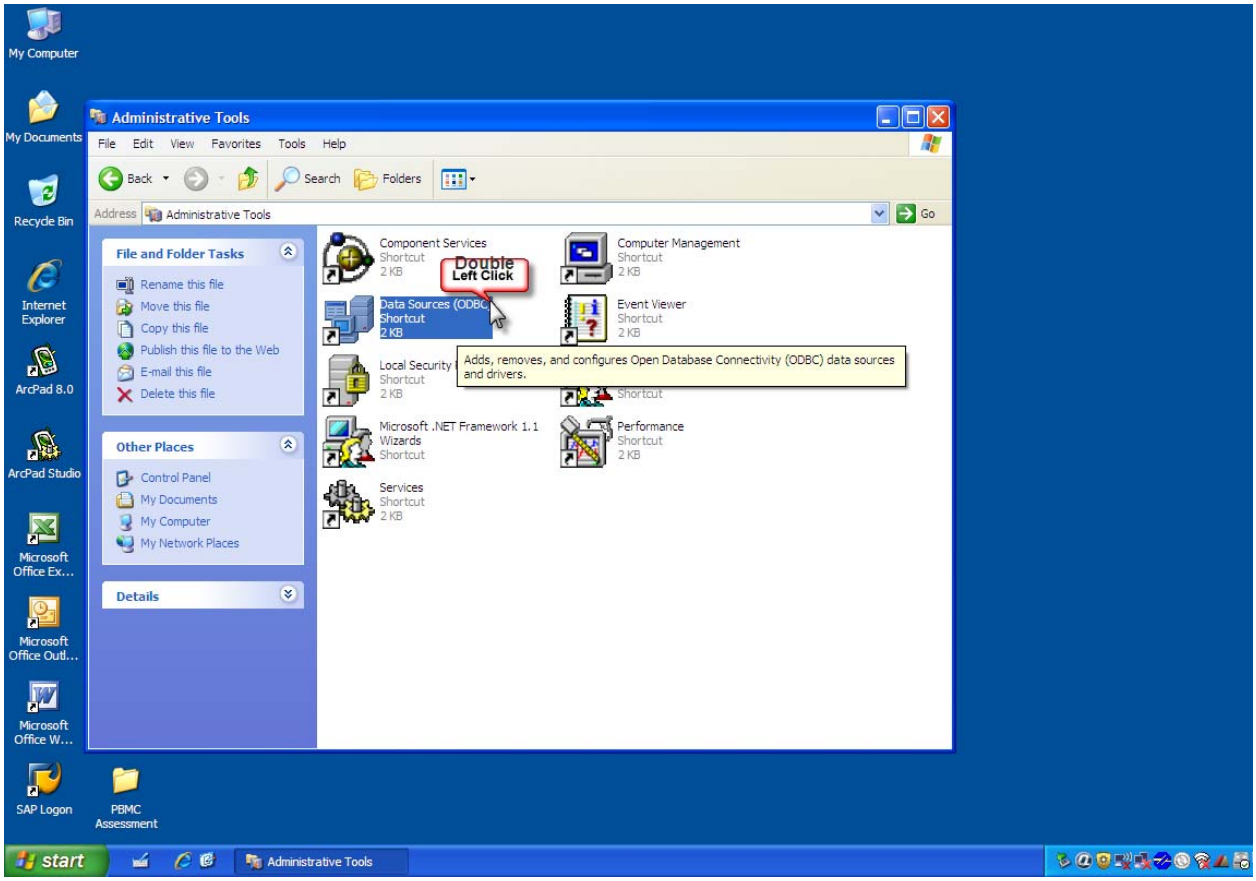
MCAP Oracle Database Creation and Setup Instructions



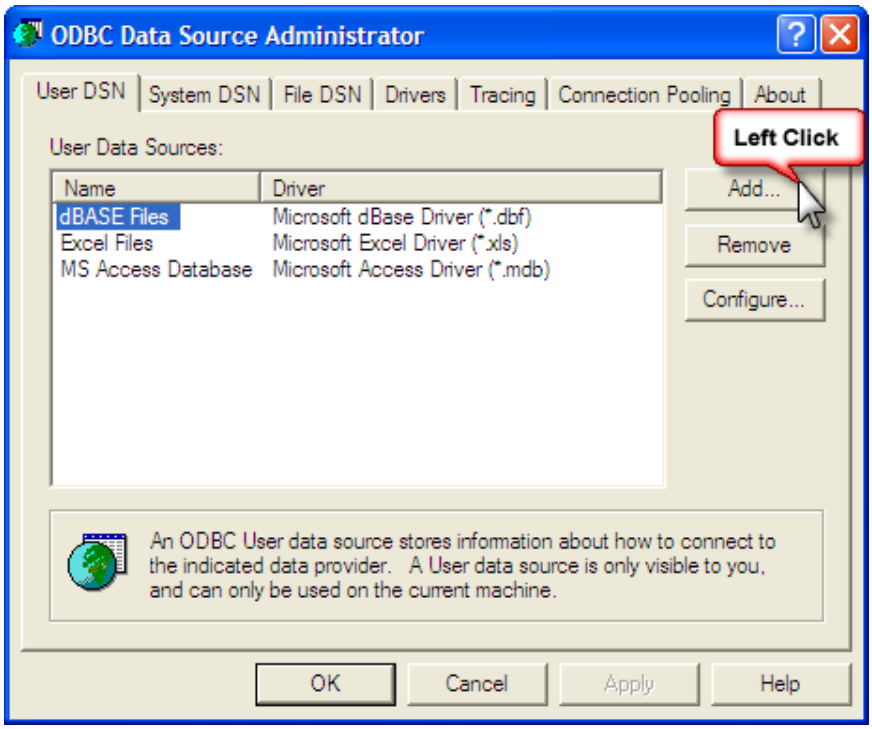
***Step 1*:** Go to Lower Left of Screen and open your **"Start Menu"** and Left click on **"Control Panel"**



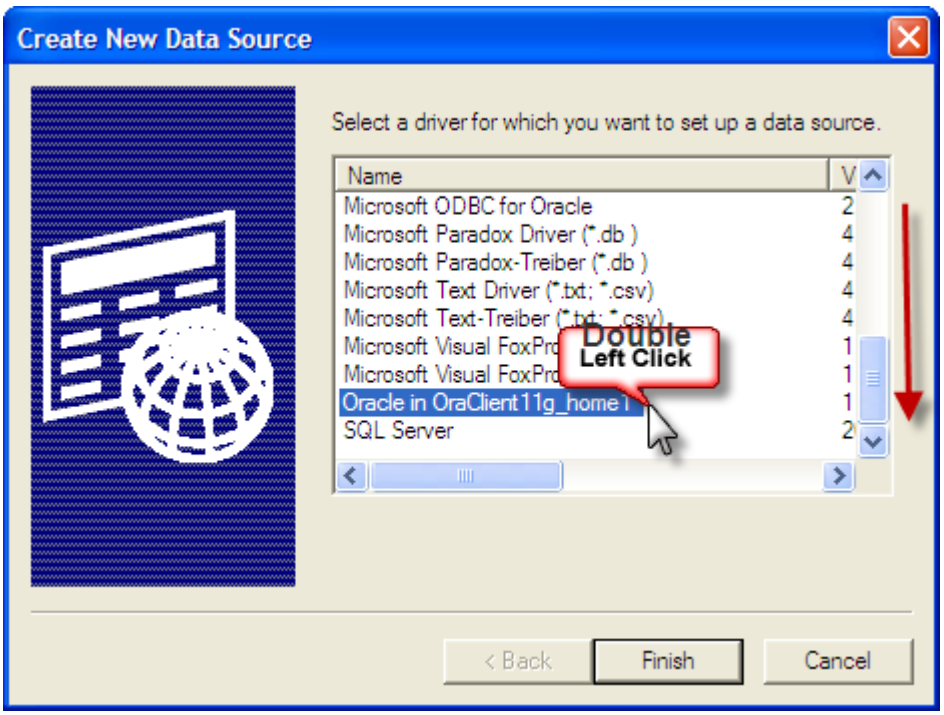
***Step 2*:** In the Control Panel window, locate and Double Left Click **"Administrative Tools".**



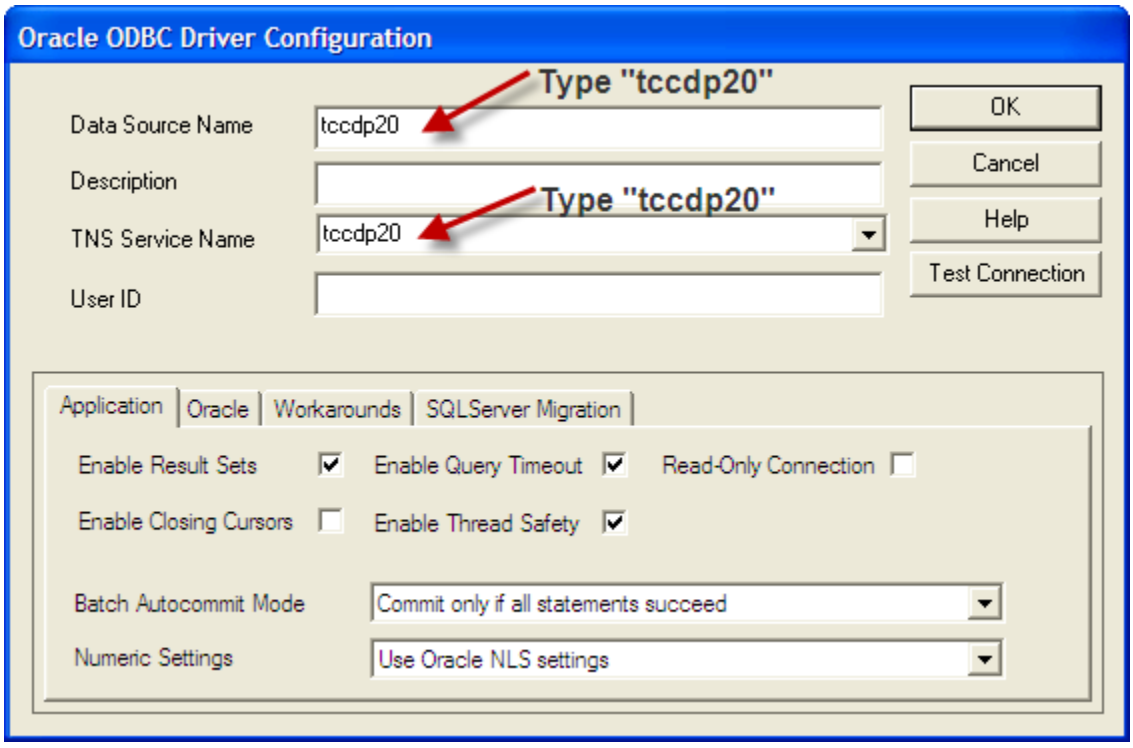
***Step 3*:** In the Administrative Tools window, locate and Double Left Click **"Data Sources".**



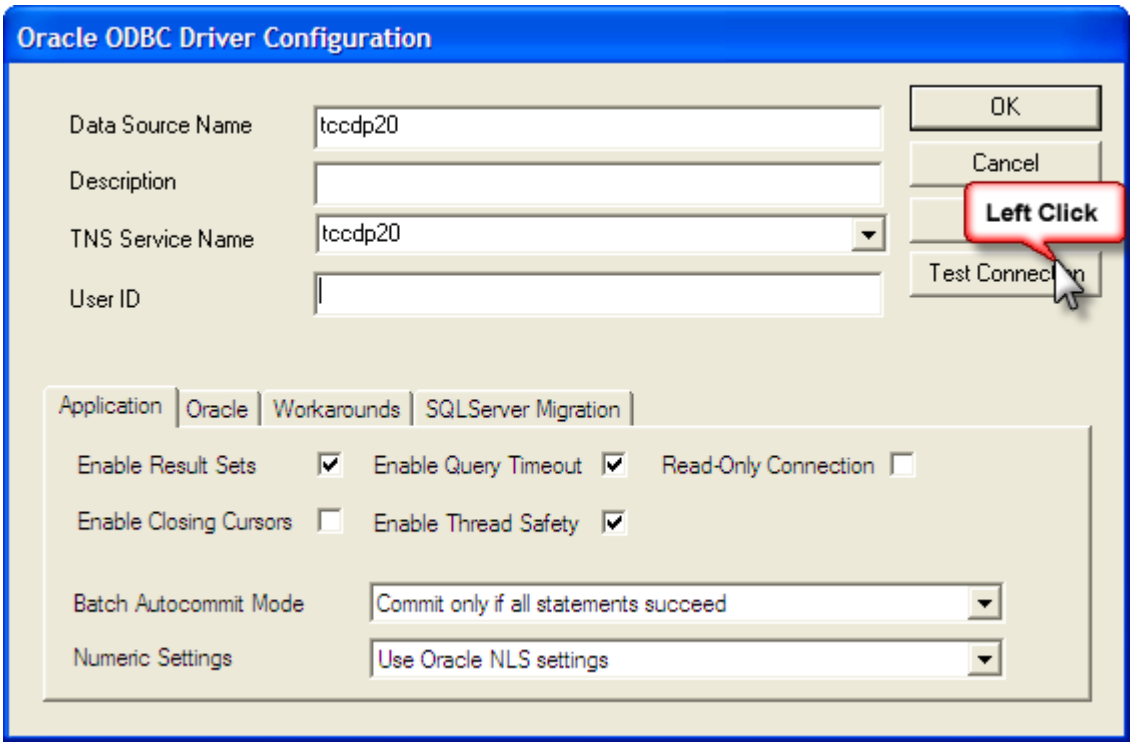
***Step 4*:** Once you have clicked on "Data Sources" a new window will pop up that should resemble the screen shot shown above. Left click the **"Add"** button located on the right side of the window.



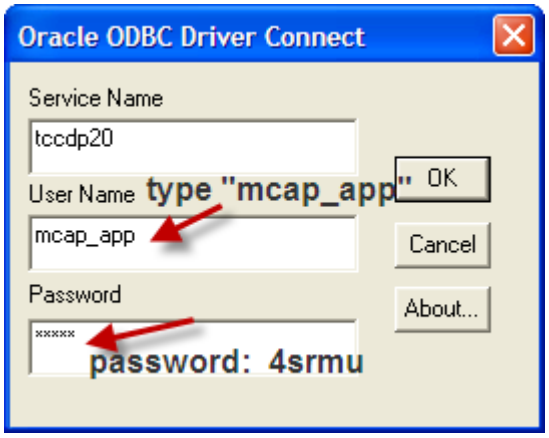
***Step 5*:** Here you will create a new Data Source. First, scroll all the way down to the bottom of the window. Second, Double Left Click on **"Oracle in OraClient11g_home1"**
If the Oracle Client is NOT on your list, you'll need to contact the Help Desk to have it added.



***Step 6*:** Now you will be prompted with a new window asking you to Configure your new database driver. In both the **Data Source Name** and **TNS Service Name** type in **"tccdp20"** in both blanks beside those fields. In the screen shot above, they are already shown typed in.



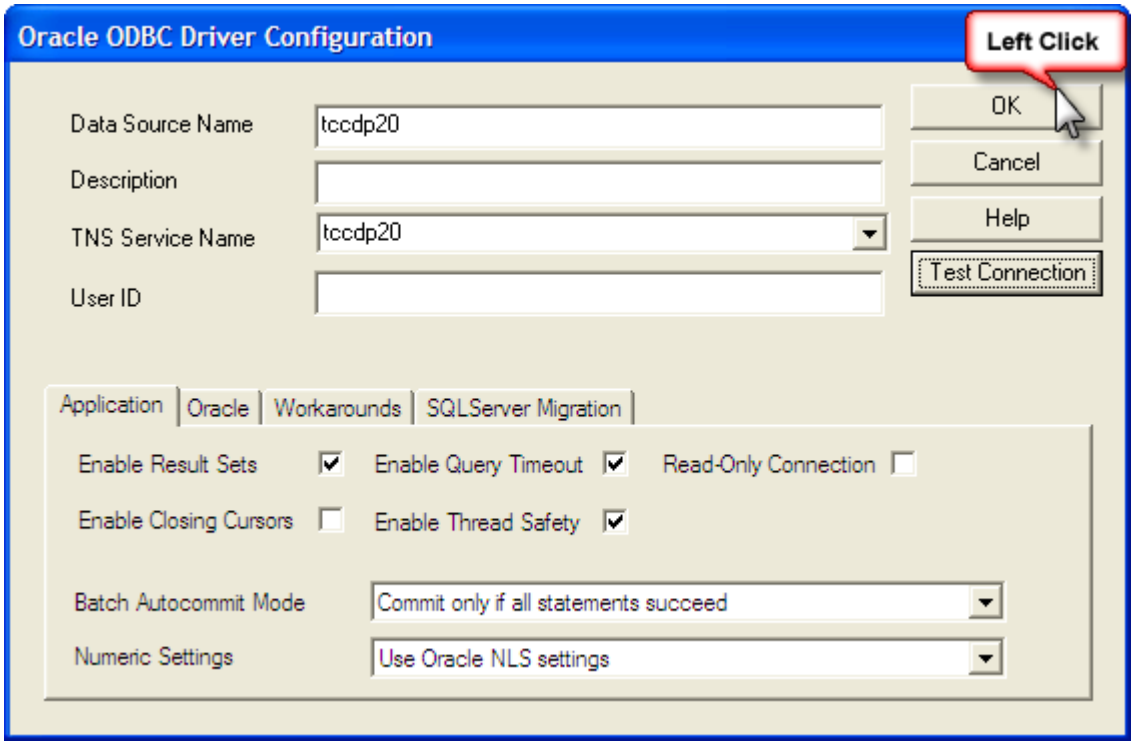
***Step 7*:** Once you've typed "tccdp20" in those 2 fields, Left Click **<u>"Test Connection."</u>**



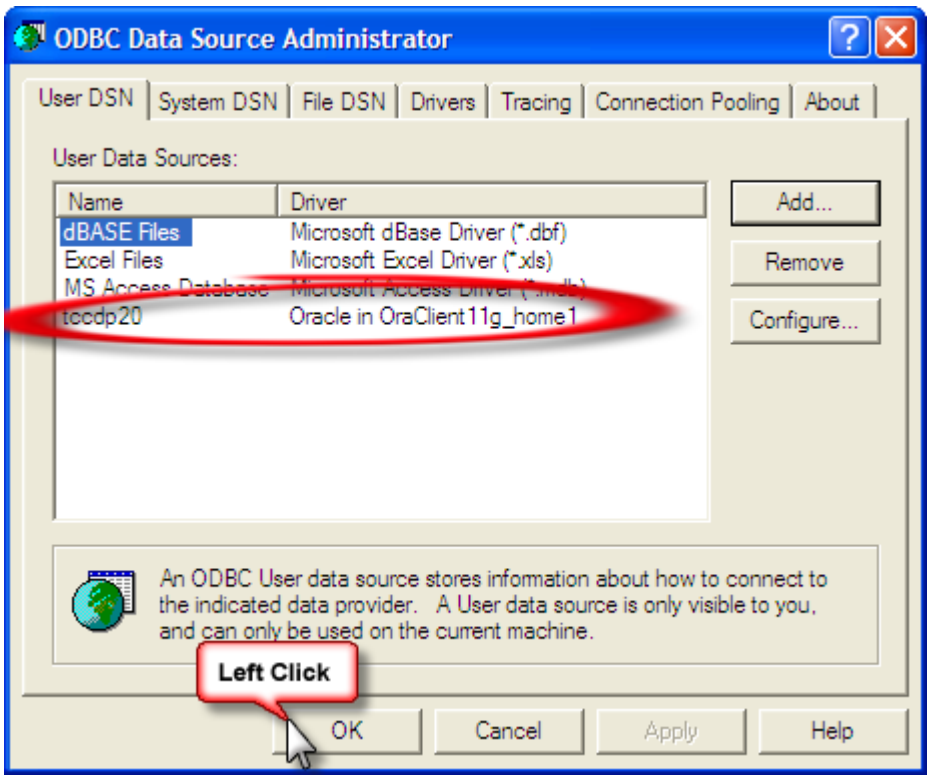
***Step 8*:** Now you will be prompted with a new window asking you for the User name and Password. Type in **<u>"mcap_app</u>**" for the User Name and **<u>"4srmu"</u>**for the Password . They are already shown typed in in the screen shot above.

***Step 9*:** Once you have typed in **"mcap_app"** for the User Name and **"4srmu"** for the Password, Left click **"OK."**

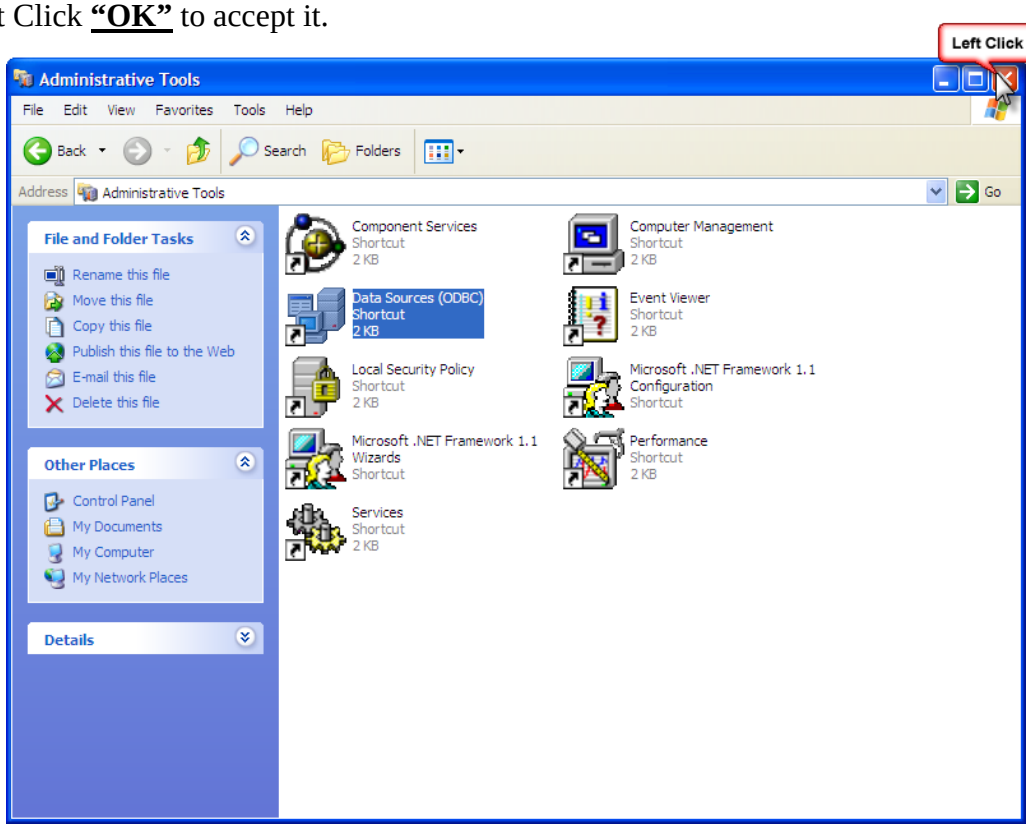
***Step 10*:** Once you hit "OK" you should see a pop-up window letting you know that the Connection was Successful. Simply Left click **"OK".**
If the connection is not successful, you'll need to contact the help desk



***Step 11*:** You will then be brought back to the Driver Configuration window that you saw earlier. At this point Left click **"OK"** in the upper right corner of the window.



***Step 12*:** After you click "OK", you will be shown the same window that you saw in Step 4. The only exception is now you should see "tccdp20" under the Name field and "Oracle in OraClient11g_home1" under the Driver field. This shows that everything was successfully setup. Now Left Click **"OK"** to accept it.

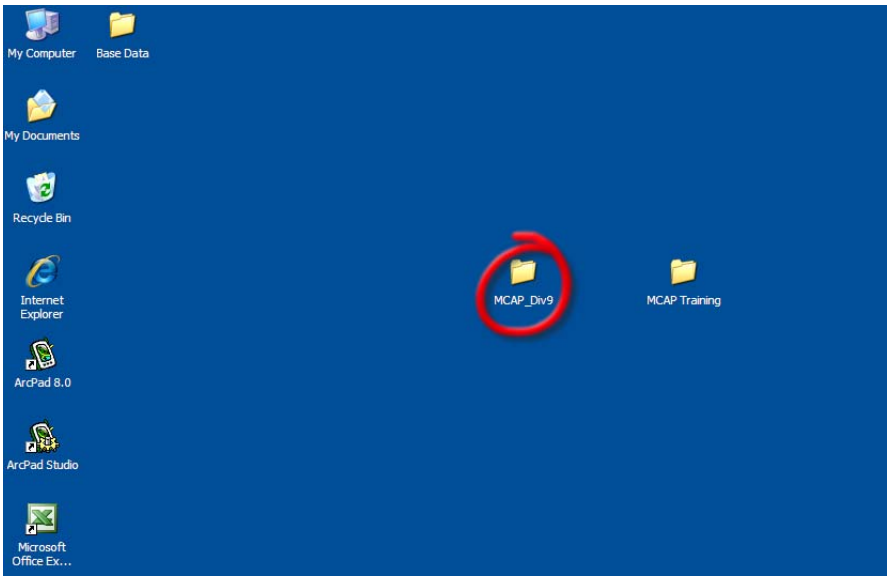


***Step 13*:** Close the Administrative Tools window by Left clicking the upper right Red X. See the other handout/file on **"MCAP Database Upload Instructions"** to continue.

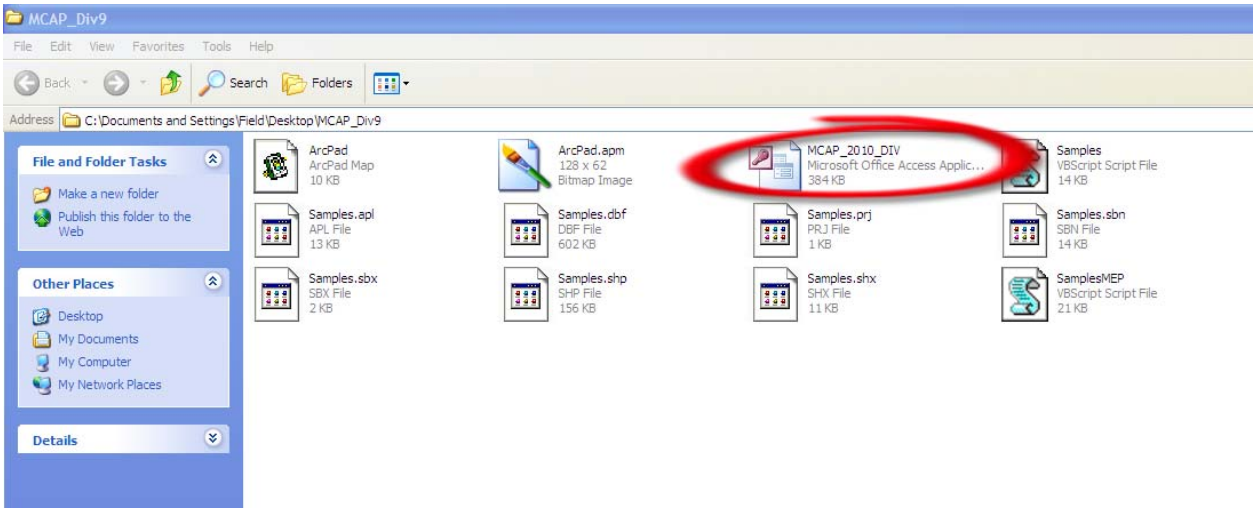
Database Upload Instructions

MCAP Database Upload Instructions

***** You must Login to your tablet while connected to the DOT Network for this process to work.*****

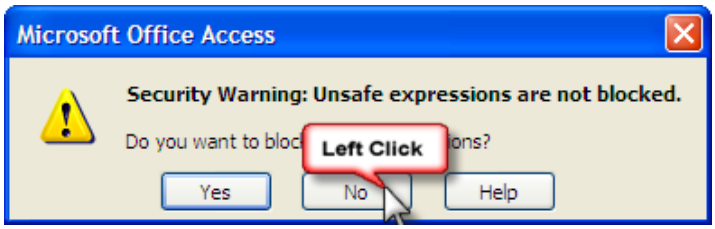


Step 1: Open your "**MCAP_DivX**" folder on the desktop.

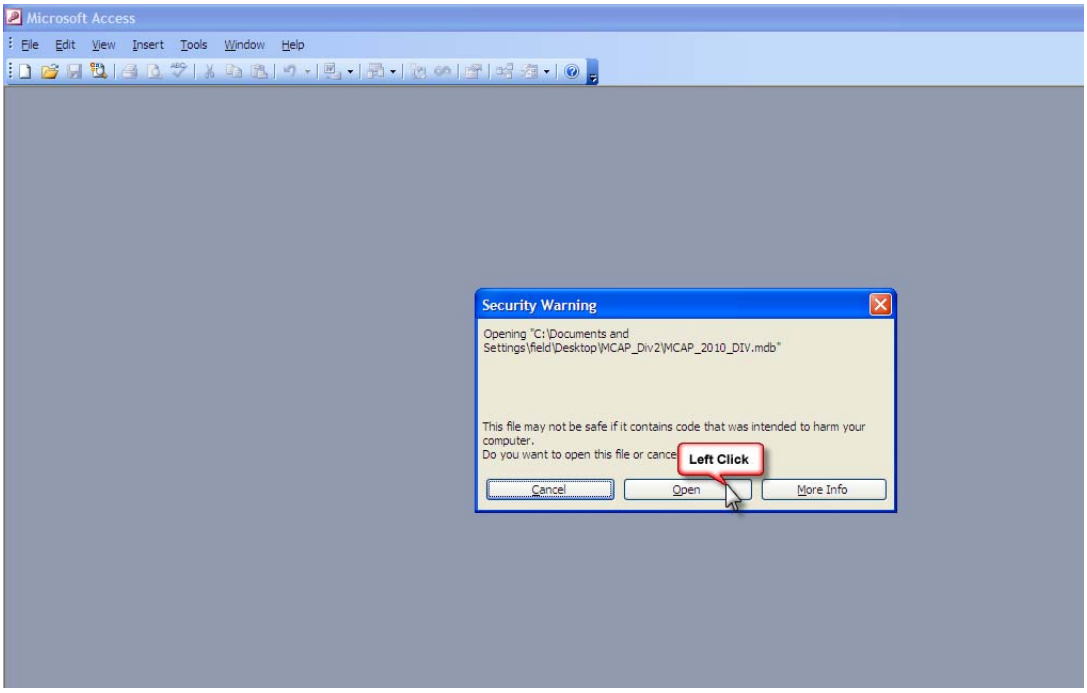


Step 2: Double Click the **"MCAP_2010_DIV"** file.

Step 3: If asked to enter your full name and initials, simply ignore and Left Click **"Ok".**

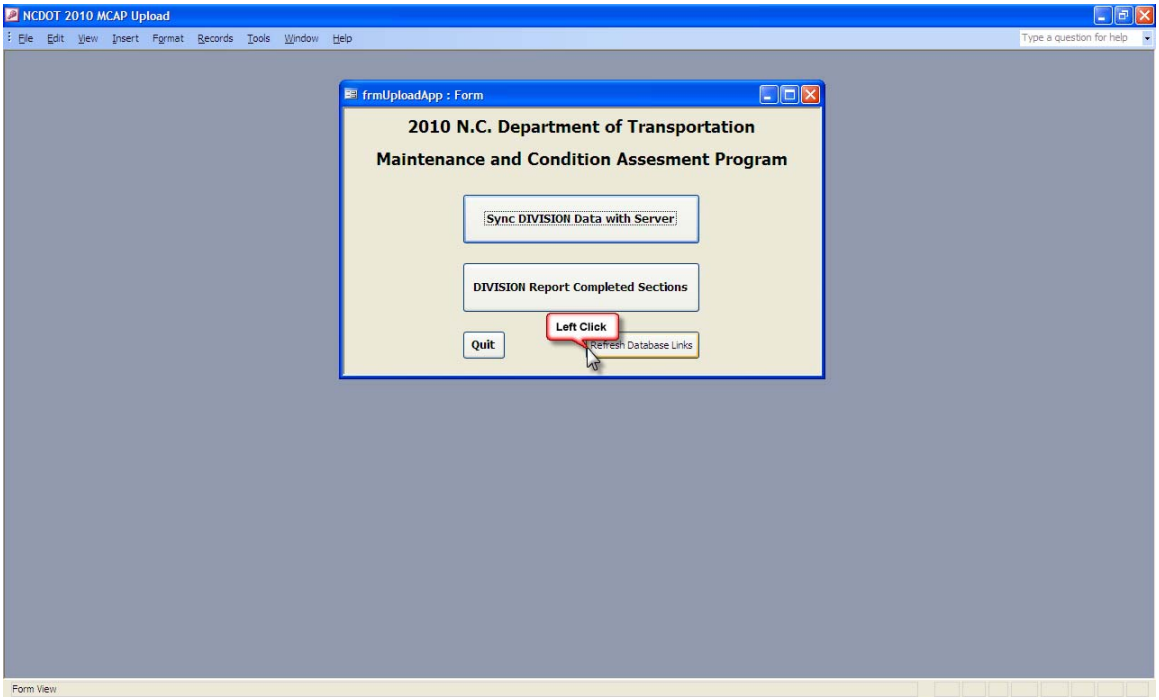


Step 4: After you have opened the **"MCAP_2010_DIV"** file, you should be prompted with this screen. Simply Left click **"No"** to continue.

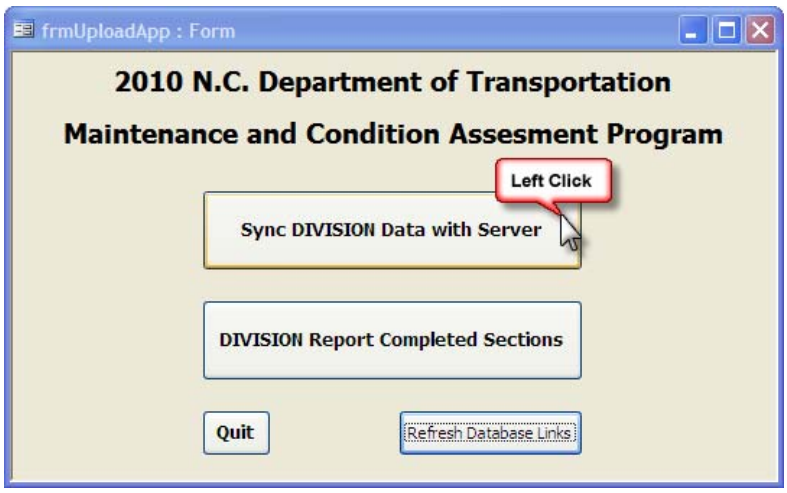


Step 5: The next screen will open a Security Warning window. Simply Left Click on **"Open"** to continue.

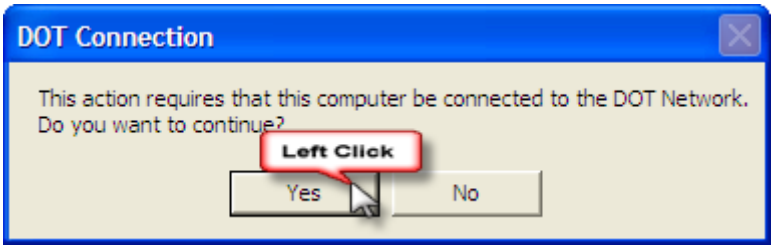
Step 6: The next screen will remind you to Refresh Database Links. Click **"Ok"** and continue.



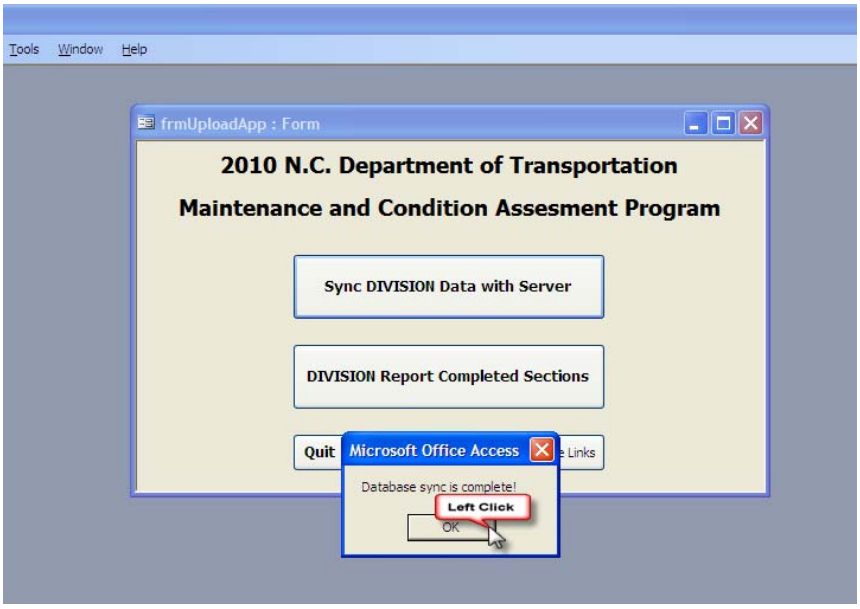
Step 7: Left Click on **"Refresh Database Links".** Once you click on that button, you'll see an hour glass pop up for about 10 seconds then your mouse will return to the normal pointer. No other window will open, continue to next step.



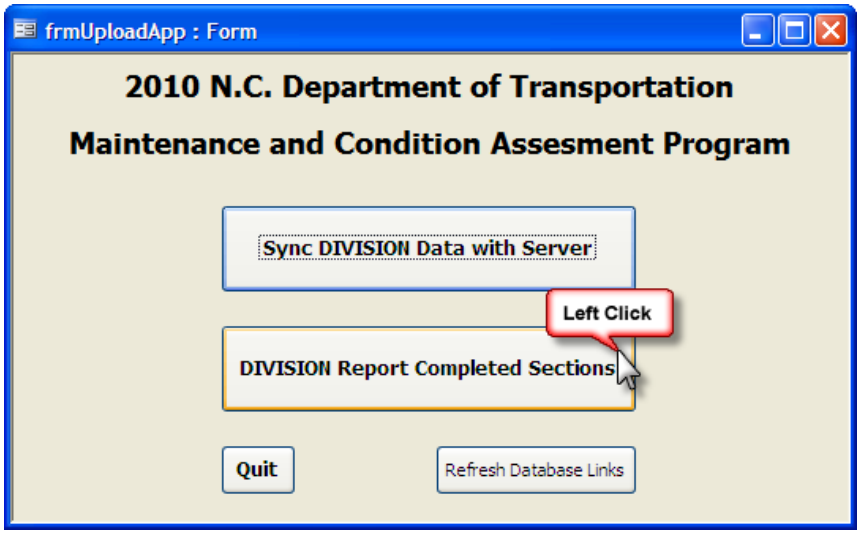
Step 8: Left Click on **"Sync Division Data with Server".** This step is where your data actually gets uploaded to the main database.



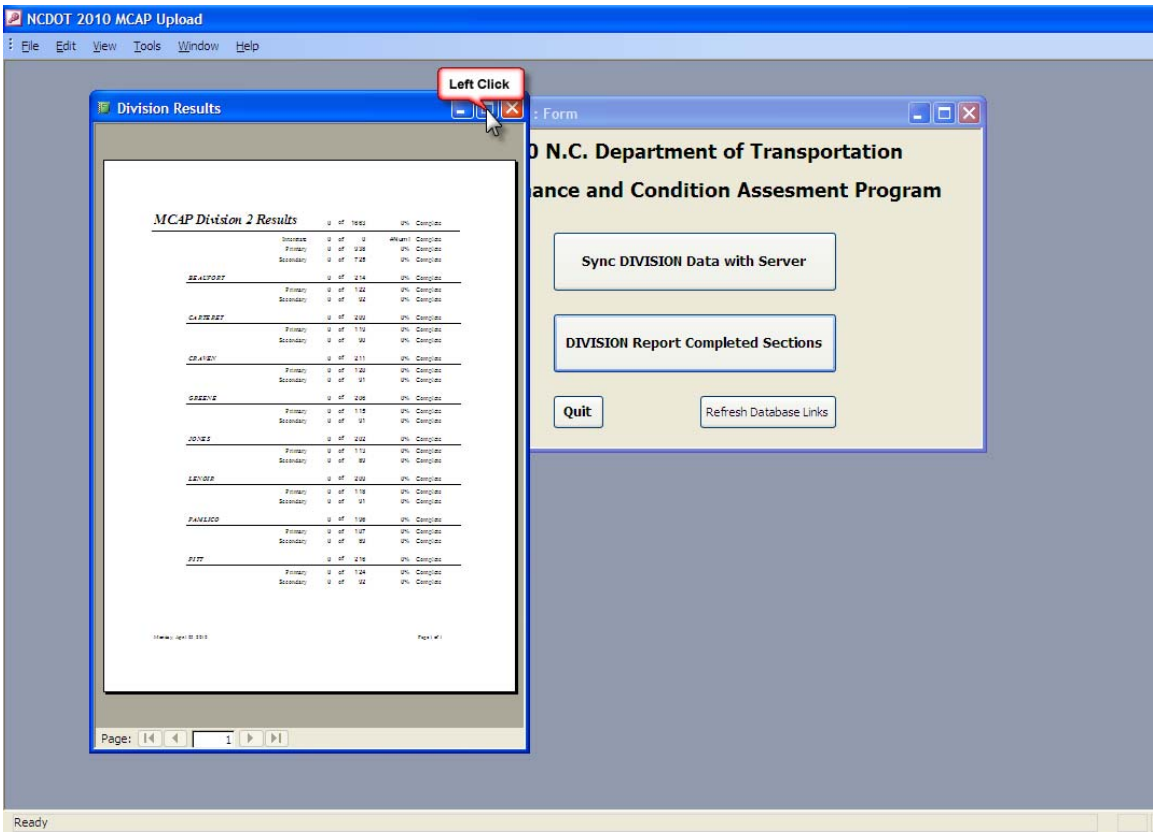
Step 9: You'll be prompted with a window asking if you are sure you want to be connected to the DOT Network. Left Click **"Yes"** to continue.



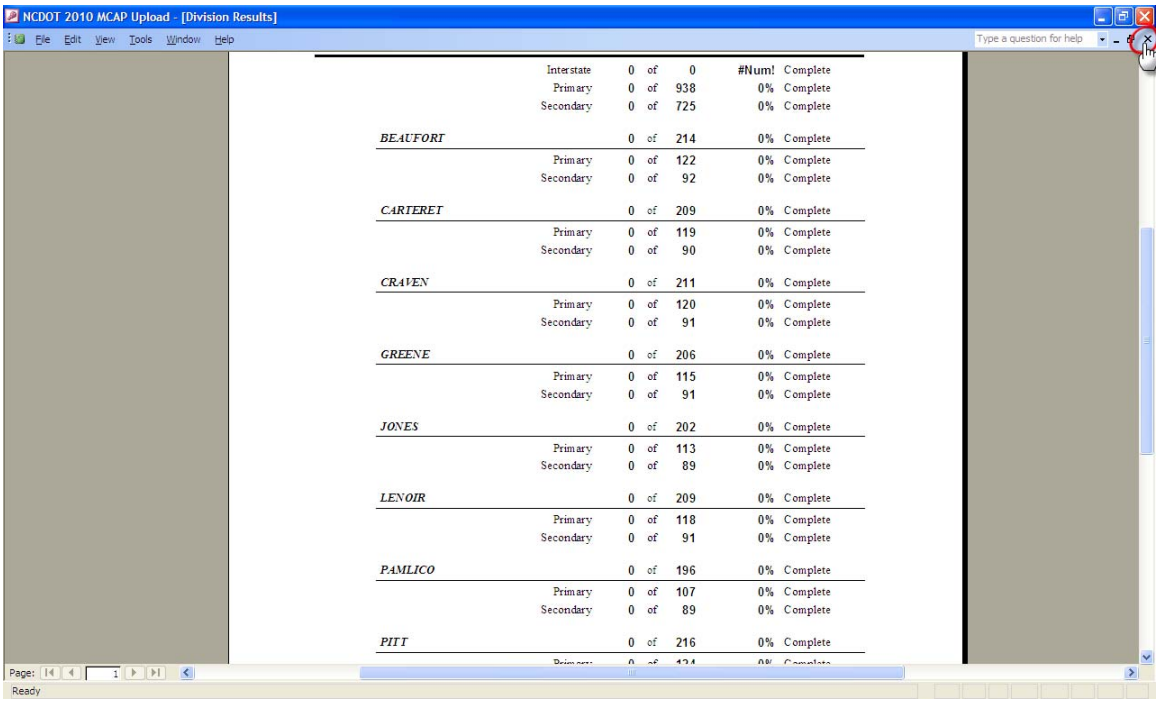
Step 10: A new window will open and tell you **"Database sync is complete".**



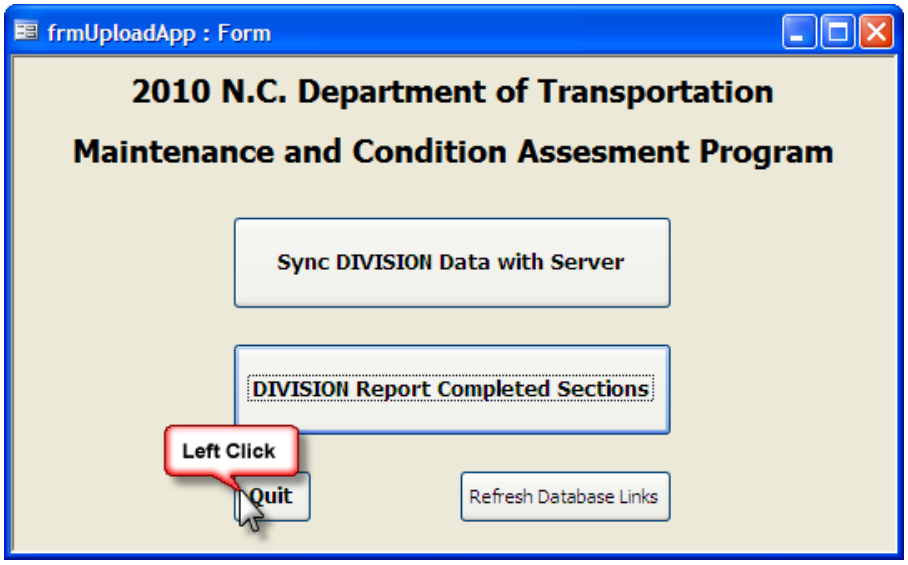
Step 11: After the Database has been successfully synced/uploaded, you can Left click on **"Division Report Completed Sections".**



Step 12: When the Division report window opens, you can left click the expand button to open it to the full extent.



Step 13: This report will allow you to see how many sections have been completed and how many are left, along with the overall percentage done, broken down to the county level. When you have finished reviewing the report, **CLICK THE SMALL "X"** in the upper right hand corner to close the report. **DO NOT click the RED X**.



Last Step: To exit properly, Left click the "Quit" button. This will close Microsoft Access. Your Data upload is complete!

*****NOTE: This process also downloads the Data Collected from the other teams to your tablet. This allows you to track what the other teams have assessed and avoid duplication of effort.*****