-TxLTAP-

South Texas Judges and Commissioners Conference

Road Maintenance and Prioritizing Road Maintenance Schedules

Exactly What is Road Maintenance?

Ask a resident of your county and they may give you a realistic description of what they have become accustomed to.

Ask another resident and they will give you an answer that they envision a roadway built to interstate standards – yet will be a county road!

For purposes of this presentation we are going to use the guidelines published in the Texas Department of Transportation Maintenance Management Manual Dated July 1, 2017 to define "Roadway Maintenance"

http://onlinemanuals.txdot.gov/txdotmanuals/mmt/manual_notice.htm

Road Maintenance Defined
Three Major Categories

- **Routine maintenance** - consists of work that is planned and performed on a routine basis to maintain and preserve the condition of roadways or to respond to specific conditions and events that restore the roadway to an adequate level of service."
- **Preventive maintenance** - planned strategy of cost-effective treatments to an existing roadway system and its appurtenances that preserves the system, retards future deterioration, and maintains or improves the functional condition of the system (without significantly increasing the structural capacity).
- **Major maintenance** - work to strengthen the roadway, structure or facility for the current and projected future traffic usage. Performed to correct a maintenance or safety problem or to protect public or private property.

Road Maintenance Defined- Categories

TxDOT breaks out routine, preventive and major maintenance into the following categories all under “roadway maintenance”

- Travel way (aka Roadway)
- Shoulder and Side Approaches
- Roadside
- Drainage
- Structures
- Traffic Operations
- Emergency Operations

Let’s take a look at routine, preventive and major for each category.

Road Maintenance Defined

Travel Way aka Roadway

Routine Maintenance	Preventive Maintenance	Major Maintenance
Pavement-related work to include restoration of pavement service-ability including: recondition, rebuild, level up, and overlay. This would include, but not be limited to: pavement repair, crack seal, bituminous level ups with light overlays to restore rideability (overlays not to exceed total average depth of 2”), additional base to restore rideability, and seal coats.	Pavement-related work performed to prevent major deterioration of the pavement. Work would normally include, but not be limited to: milling or bituminous level-ups to restore rideability, light overlays (overlays not to exceed total average depth of 2”), seal coats, crack sealing and micro-surfacing. Preparatory work such as milling, repairs or level-ups may also be performed.	Pavement-related work to strengthen the pavement structure for the current and projected future traffic usage. Work should include: restoration of pavement serviceability of roadway. This would include but not be limited to: recondition and stabilize base and subgrade, add base, level up, overlays and seal coats. Pavement widening can be considered major maintenance if done to correct a maintenance problem.

Road Maintenance Defined

Shoulder and Side Approaches

Routine Maintenance	Preventive Maintenance	Major Maintenance
All shoulder work to restore to its originally constructed condition including: recondition, rebuild, level-up and overlay. This work would also encompass installation and maintenance of public access drives, crossovers, turn lanes and mailbox turnouts.	All shoulder work to prevent major deterioration of the pavement including: milling or bituminous level-ups to restore cross section, light overlays (overlays not to exceed total average depth of 2”), seal coats, crack sealing and micro-surfacing. Shoulder repair and widening not to exceed 26’ full roadway width.	All shoulder work to restore to its originally constructed condition and/or to strengthen the pavement structure for the current and projected future traffic usage, including but not limited to: recondition and/or stabilize base and subgrade, add base, level up, and seal coats. Adding shoulders, if done to correct a maintenance problem.

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Road Maintenance Defined

Roadside

Routine Maintenance	Preventive Maintenance	Major Maintenance
All work to maintain the roadside including but not limited to: maintenance and operation of rest areas and picnic areas, litter removal, mowing, placing herbicides, tree and brush trimming and removal, repair and upgrading of guard rails and extruder terminals, repairing slides and side slopes, placing topsoil, sod, shrubs, etc. to reestablish proper grade and vegetative cover and landscaping, removal or treatment of roadside hazards, installation and maintenance of environmental protection devices, and mitigation of spills or hazardous materials.	None	None

Road Maintenance Defined

Drainage

Routine Maintenance	Preventive Maintenance	Major Maintenance
Replacement, repair and installation of curb, gutter, riprap and underdrain; cleaning, repairing or replacing culverts, storm sewers, erosion controls; reshaping drainage ditches and channels.	Removal of debris and siltation from channels to prevent damage to structures or flooding of roadways. Repair or replacement of slopes and/or riprap to prevent damage to structures or embankments.	Constructing new drainage channels or modification of drainage structures to increase drainage capacity. Performed only to correct a maintenance or safety problem or to protect public or private property.

Road Maintenance Defined

Structures

Routine Maintenance	Preventive Maintenance	Major Maintenance
Repair of substructures, superstructures, decks, joints, approach slabs and railing; spot painting; repair and operation of movable bridges; installation of temporary bridges; repair and installation of fender systems.	Steel structure cleaning and repainting or the installation of other coatings; installation of bridge deck protection; joint cleaning and sealing or replacement.	Bridge rehabilitation, reconstruction, or replacement. Replacement of structures only as a result of major disaster when no other funds or programs are available.

Road Maintenance Defined

Traffic Operations

Routine Maintenance	Preventive Maintenance	Major Maintenance
Installation, repair and replacement of signs, delineators, illumination, signals and related appurtenances; installation and replacement of striping, pavement graphics, raised pavement markings and rumble strips; maintenance of traffic control cabinets and the corresponding attachments (including but not limited to loop detectors, video cameras, changeable message signs, etc.).	Replacement of striping, pavement graphics, raised pavement markings, and rumble strips may be performed in conjunction with a resurfacing operation.	Installation of new signal systems to upgrade outdated designs.

Road Maintenance Defined

Emergency Operations

Routine Maintenance	Preventive Maintenance	Major Maintenance
Assistance to traffic during accidents including traffic control, removal of debris and spilled cargo, and snow and ice control. Assistance to traffic during other natural disasters such as floods, tornadoes, hurricanes and fires; removal of debris from the roadway after natural disasters. The County Judge determines that immediate action is needed to respond to imminent threat to life or property or to prevent disruption of the orderly flow of traffic and commerce.	None	None

OK – I know what routine, preventive and major maintenance activities are – what now?

The next steps are working on the prioritization of your work tasks – what activities need to rise to the top of your constantly shifting list of work items and those activities that can be deferred until a later date.

What does "Prioritization" Mean?

Ask 10 people what "prioritization" means – and you will get 10 different answers.

Some of the answers may be close enough to one another, but will still be far enough apart to have different expectations.

Having different expectations can lead to misunderstandings that can lead to challenges for a county commissioner, a county judge, or a county engineer and the residents of the county.

Having a clear set of "prioritizations" is critical for efficient and productive work to take place in any business setting.

Let's look at one of the many prioritization models that is simple, yet effective that can be used in roadway maintenance work.

My Priority Is Not Your Priority – WHY?

Keep in mind that there is no “one prioritization model fits all” solution. Even data driven maintenance planning and scheduling programs cannot anticipate the unknown.

You, as a commissioner or judge are the key to what your priorities need to be as you know your roads, your constituents, your budget and your local political environment.

The following will help provide some guidance in how to help prioritize work tasks.

6 Steps to Prioritizing Work Activities

1. Write down a list of all work tasks/activities
2. Identify emergency vs. urgent vs. important vs. routine vs. planned
3. Assess value
4. Order tasks by estimated effort
5. Be flexible and adaptable
6. Know when to cut

Source: https://www.liquidplanner.com/blog/how-to-prioritize-work-when-everythings-1/

Make a list of all work activities

Pull together everything you could possibly consider that needs to be done. Don't worry about the order, or the number of items. Items to consider are:

- Calls from citizens
- Pot holes needing to be fixed
- Roads to be graded
- Signs or markers down and/or missing
- Mowing
- Preventive maintenance on equipment
- Drainage ditches to be cut
- Employee training
- Culvert installations
- Plans for future chip sealing of roads
- Materials to be ordered
- Preparation for commissioners court
- Center stripe application
- Installing delineators

Emergency vs. Urgent vs. Important vs. Routine vs. Planned

The next step is to see if you have any tasks that need immediate attention. We're talking about work that, if not completed by the end of the day or in the next couple of days, will have serious negative consequences. These are your **Emergency** and **Urgent** categories.

Let **SAFETY** **always be your guide for task prioritization.**

Let's look at some samples of Emergency, Urgent, Important, Routine and Planned tasks to set priorities.

Emergency vs. Urgent vs. Important vs. Routine vs. Planned

An **EMERGENCY** work task would be a downed 

sign at an intersection to avoid a potential vehicle crash.

An **URGENT** work task would be grading a road to make it passable after a heavy rain event.

An **IMPORTANT** work task would be filling potholes on a low traffic volume road.

A **ROUTINE** work task would be mowing the county ROW.

A **PLANNED** project is typically going to take longer, is going to be a major upgrade and can have significant costs attached.

Assess Value of the Work / Task Item

Next, look at your IMPORTANT, ROUTINE and PLANNED work projects and identify what carries the highest value to your county or precinct. As a general practice, you want to recognize exactly which types of tasks have top priority over the others.

For example, focus on client projects before internal work; such as fixing pot holes before preparing for a non-critical meeting. Another way to assess value is to look at how many people are impacted by your work. In general, the more people involved or impacted, the higher the stakes.

Order tasks by estimated effort

If you have tasks that seem to tie for priority standing, check their estimates, and start on whichever one you think will take the *most* effort to complete.

Productivity experts suggest the tactic of starting the lengthier task first. But, if you feel like you can't focus on your more time consuming projects before you finish up the shorter task, then go with your gut and do that.

It can be motivating to check a small task off the list before diving into deeper waters.

Be Flexible and Adaptable

Uncertainty and change are a given in roadway maintenance operations. Know that your priorities will change, and often when you least expect them to. But—and here's the trick—you also want to *stay focused on the tasks you're committed to completing.*

Know When to Cut

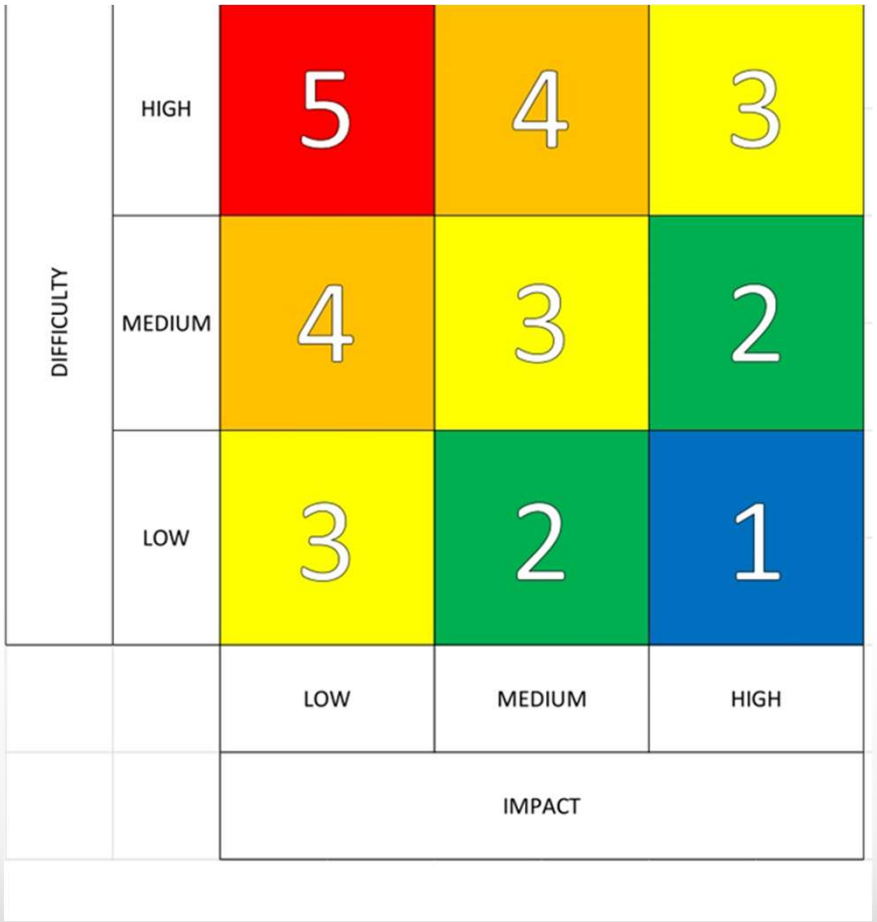
You probably can't get to everything on your list as quickly as you would like to. It's OK – quality road maintenance is not a race you win quickly.

After you prioritize your tasks and look at your estimates, move the remaining tasks to the bottom of your list, and focus on the priorities that you know you must and can complete in as a reasonable time possible.

Now let's move on to how to apply the principles of prioritization to the different categories of road maintenance.

Prioritization Matrix

Many Project Managers use the Lean Prioritization Matrix to quickly identify which work tasks or projects will provide the highest value (impact) with minimum difficulty and/or cost. Using this matrix helps to take the guesswork out of decisions.

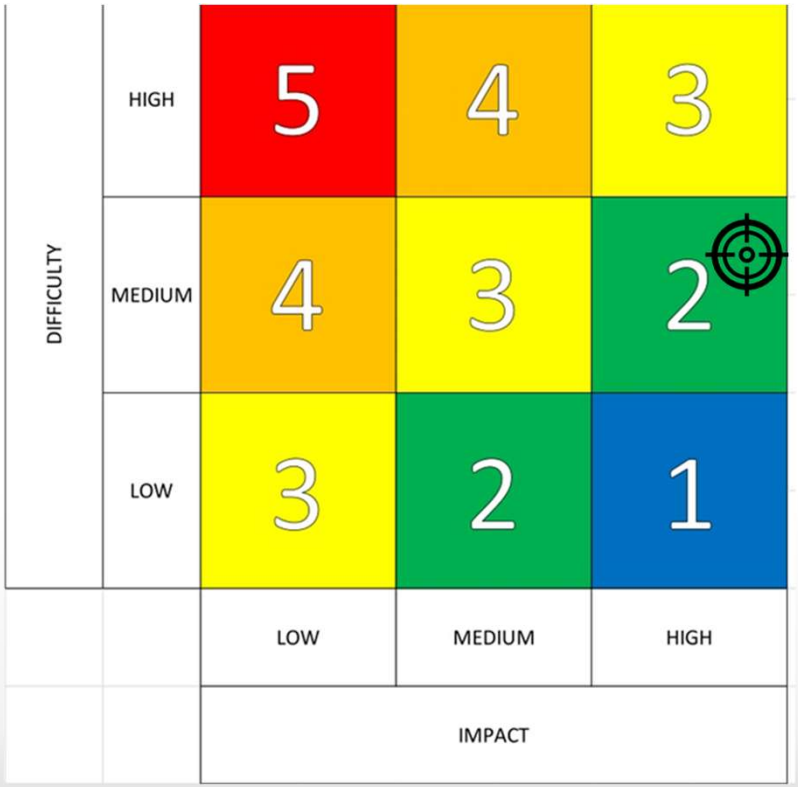


How to Use the Prioritization Matrix

All work tasks need to be divided into one of three categories as to the **VALUE** completion of the task will be. Rank as Low, Medium or High.

The same work tasks also need to be divided into one of three categories as to the **EFFORT** (time to complete and number of resources or employees or cost) to complete the job. Rank as Low, Medium or High.

The example shown is a task that has a **High VALUE** and a **Medium EFFORT**.



Using the Prioritization Matrix – What Do The Colors Mean?

The colors used on the matrix actually represent a visual reference to tasks.

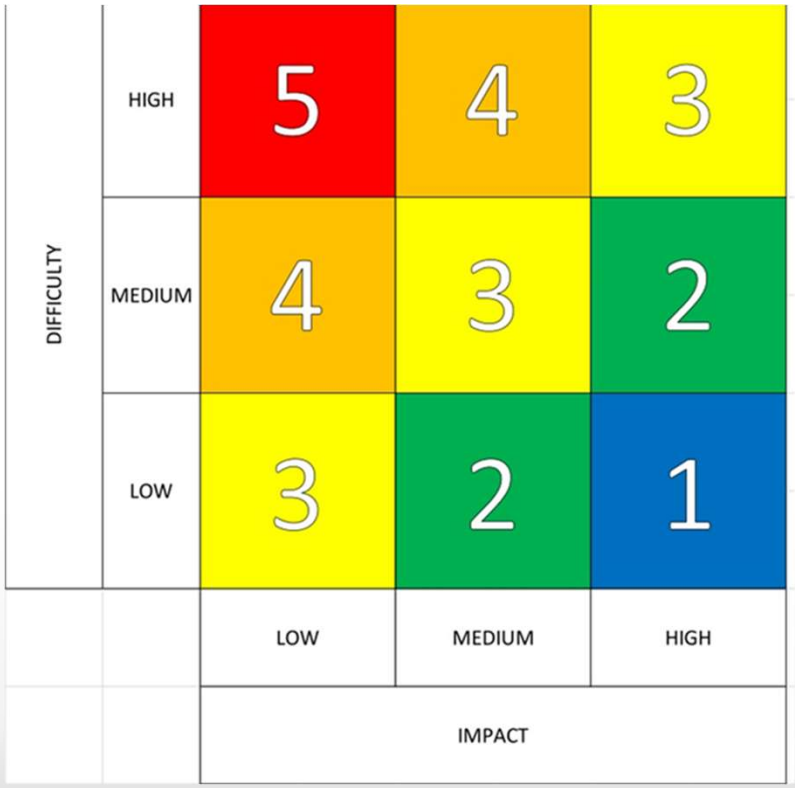
BLUE (Ranking #1) Cool **BLUE** means go for it!

GREEN (Ranking #2) **GREEN** is just like the stop light, GO!

YELLOW (Ranking #3) **YELLOW** Is just like a stop light again, slow down and think it through

ORANGE (Ranking #4) **ORANGE** is like cautionary signs used in work zones, proceed with caution

RED (Ranking #5) RED is like the stop sign or traffic light STOP and really plan!

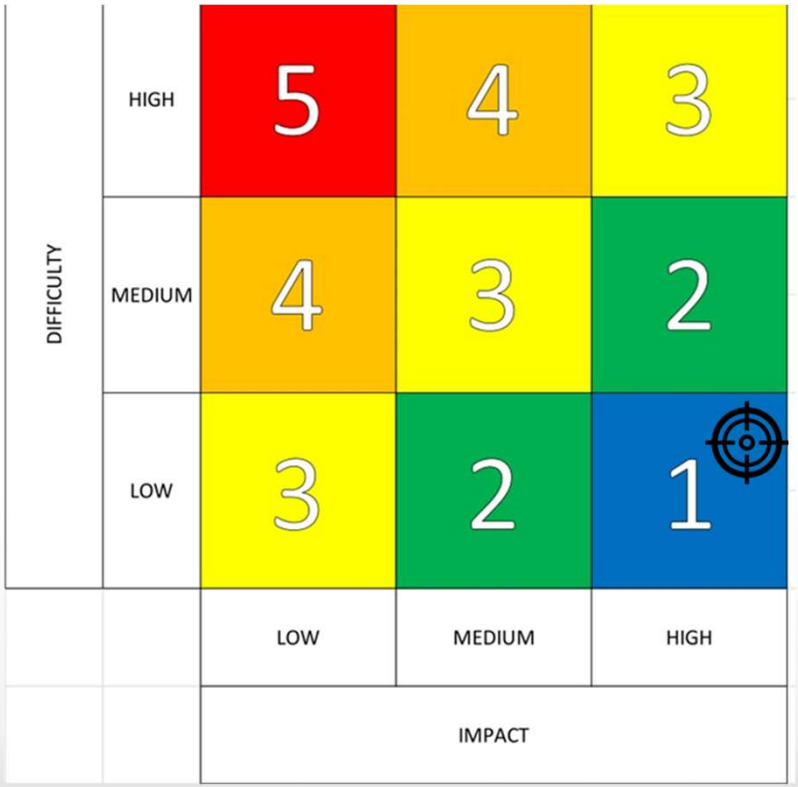


Using the Prioritization Matrix – Quick Wins

Quick Wins are those tasks that will carry a **Ranking Value of 1** on the Matrix.

These tasks always have a **High VALUE/IMPACT and a Low EFFORT of DIFFICULTY or COST.**

Just don't focus on Quick Wins all the time, you cannot ignore the more complex projects you have in front of you!

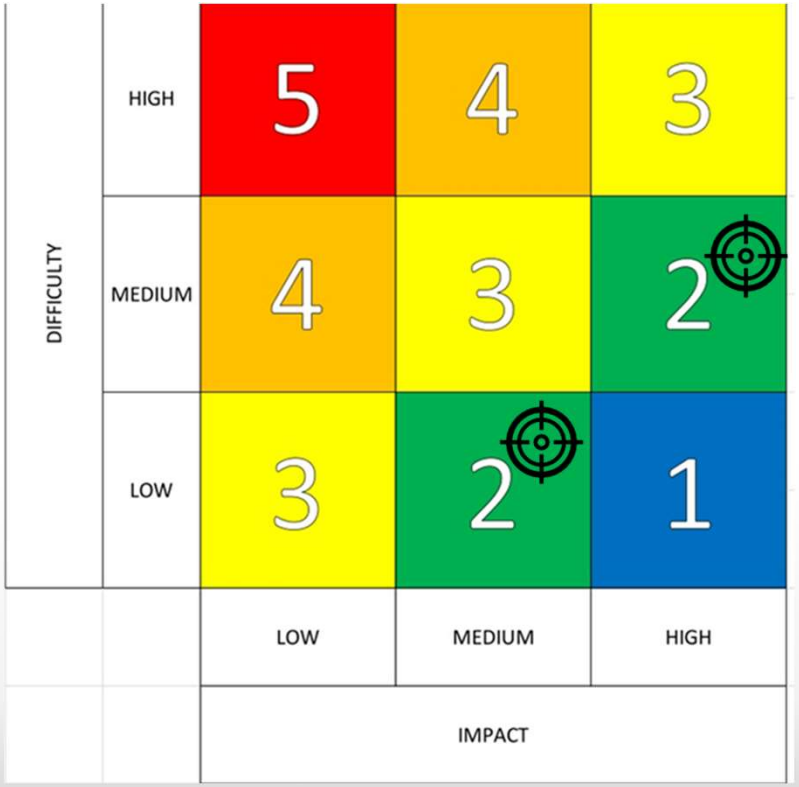


Using the Prioritization Matrix – Getting the Job Done

Getting the Job Done are those tasks that will carry a **Ranking Value of 2** on the Matrix.

These are tasks that have a **High VALUE/IMPACT and a Medium EFFORT of DIFFICULTY or COST; or a Medium VALUE/IMPACT and a Low EFFORT of DIFFICULTY or COST.**

Many of your tasks will fall into this category or is typically Routine in nature

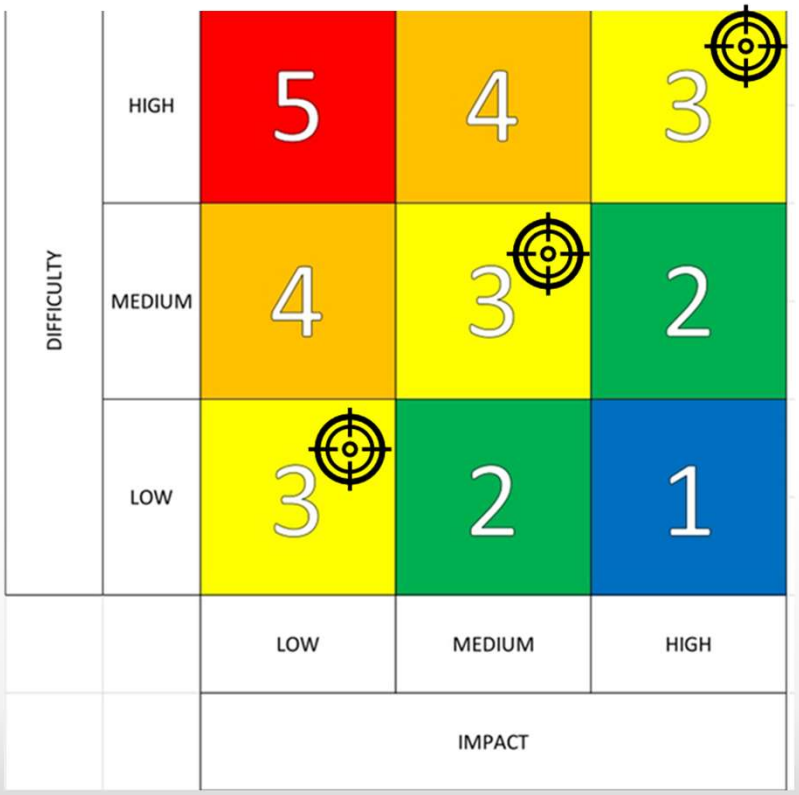


Using the Prioritization Matrix – Important Work

Important Work are those tasks that will carry a **Ranking Value of 3** on the Matrix.

These are tasks that have a **High VALUE/IMPACT and a High EFFORT of DIFFICULTY or COST; or a Medium VALUE/IMPACT and a Medium EFFORT of DIFFICULTY or COST; or a Low VALUE/IMPACT and a Low EFFORT of DIFFICULTY or COST.**

When we say slow down, it's not meant on the pace of the work, but to slow down and plan deliberately. This type of maintenance work is typically Preventive.

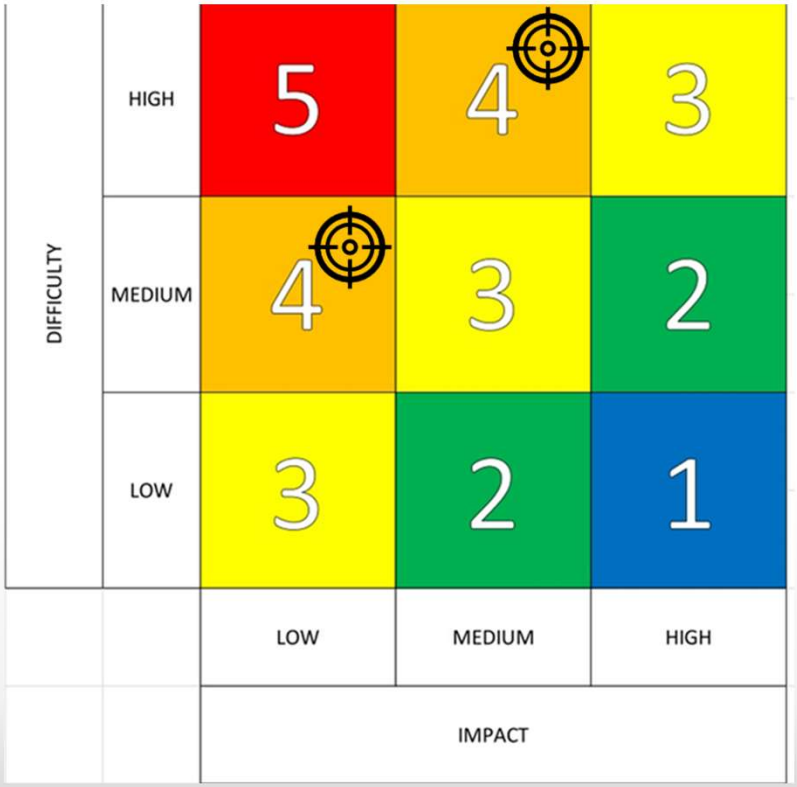


Using the Prioritization Matrix – Just Do It

Just Do It are those tasks that will carry a Ranking Value of 4 on the Matrix.

These are tasks that have a **Medium VALUE/IMPACT and a High EFFORT of DIFFICULTY or COST; or a Low VALUE/IMPACT and a Medium EFFORT of DIFFICULTY or COST.**

These are tasks where you just have to suck it up and get it done to make your roads better and safer, but know it's going to take time, money and resources. Use CAUTION as you proceed and plan it out well.

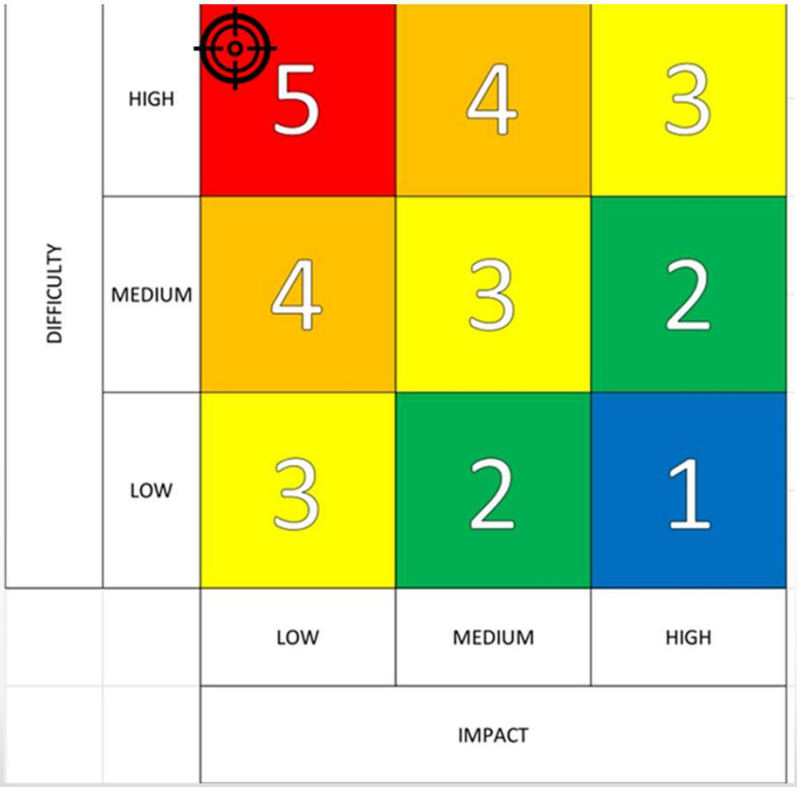


Using the Prioritization Matrix – Complex

Complex are those tasks that will carry a **Ranking Value of 5** on the Matrix.

These are tasks that always have a **Low VALUE/IMPACT and a High EFFORT of DIFFICULTY or COST.**

It is not proposed you never have to do Level 5 projects, because you will have to. It is only suggested that you ***STOP and really think it through well, have a written plan and use all resources available to you to do the job.***



Planning and Scheduling Follow Prioritization

- Once you have prioritized your work tasks, planning and scheduling to complete those tasks should now take place.
- **Planning decides** what, how and time estimates for the job.
- **Scheduling decides** when and who will do the job.
- **Planning** of a job should be done before Scheduling a job.

"Failing to plan for a job is planning to fail"

Planning and Scheduling: Why Do It? Can't We Just Go To Work?

- Taking the time to plan and schedule work will benefit you by:
  - Having less rework
  - Bringing in project completions on time rather than a "guesstimate" when you will be done
  - Improved safety by doing work in a prepared way
  - Better utilization of equipment, especially when sharing equipment assets across precinct boundaries
  - Staying on track with the task at hand

Putting It All Together

When you put together all of the components of planning and prioritizing your various work items and projects, your plan may look something like this. A simple drawing on a whiteboard in a Commissioners office, an Excel spreadsheet or a commercial planning and scheduling software can all accomplish the same goal for you!

Work Item/Task	Impact	Difficulty	Ranking	Maintenance Category	Classification
Grade CR1234 pulling material from ditch and build new crown (0.3 miles)	HIGH	MEDIUM	2	ROUTINE	ROUTINE
Reinstall Stop sign down at Intersection of CR 1234 and CR 5678	HIGH	LOW	1	ROUTINE	EMERGENCY
Remove 8" culvert and install 24" culvert on CR 3456 at Harrigans Crossing to prevent future flooding	MEDIUM	HIGH	4	PREVENTIVE	IMPORTANT
Place delineators on all culvert crossings on CR 9876 (2.1 miles) removed by vandals	MEDIUM	LOW	2	ROUTINE	IMPORTANT
Construct new concrete drainage channel and modify existing channels on CR 9875	LOW	HIGH	5	MAJOR	PLANNED
Fill washout on CR 6543 from heavy rain damage, @ 40'	MEDIUM	LOW	2	ROUTINE	URGENT
Crack seal 1.5 miles of CR 2345 from Smith driveway to Hernandez driveway	MEDIUM	MEDIUM	3	ROUTINE	ROUTINE

Best Practice Case Study – Planning & Scheduling

In 2016 I had the opportunity to observe first hand a highly efficient work project in the Texas panhandle that involved the workforce of four different TxDOT maintenance sections (counties) that joined together on a common project.

The four maintenance sections had **PLANNED** and **SCHEDULED** in advance to place all of their workforces together (a total of 32 personnel) a select week and do a chip seal operation on Farm-To-Market roads. This work was done by the crews and not contracted. The crews worked a standard 10 hour 4 day week they normally operate.

Work crews provided an A to Z operation – public road closure/shift notices, pre-operational readiness of all equipment and light trucks to be used, road preparation (sweeping and debris removal), TMA equipped trucks, work zone control, flaggers, shooting tack asphalt, spreading aggregate, pneumatic rolling of aggregate, sweeping for excess aggregate removal, inspection by supervisors and final reopening of lanes and making ready for restriping of lanes.

Best Practice Case Study – Planning & Scheduling continued

Over 20 miles of road were completed in 4 working days. This process was repeated in all four counties with equal results so that all maintenance sections (counties) equally shared in resources provided, work provided and end results.

From supervisor interviews, they said that in order to do 20 miles of chip seal with only their workforce of 8 employees, they would have had to out-source all of the work zone traffic control, aggregate spreading and would have been able to only do 1 – 2 miles per day at a higher cost and substantially more time.

By coming together, planning together and scheduling together, more work was accomplished at lower cost in a compressed time frame vs. each maintenance section going it alone.

If you are hesitant, or simply do not have the resources to cross county lines and pool workforce resources, please consider joining precincts together on projects that will benefit your county as a whole.

Case Study: How Things Go Wrong Without Planning

A 40 years on-the-job highly experienced steelworker was operating a mobile scissor lift on uneven terrain. He was placing bolts into steel joists to complete their installation, and was using the scissor lift to position himself so he could reach the beams. As he drove the lift closer to a beam on which he intended to work, the front tires entered a ditch that dropped approximately 1½ feet over a space of about four feet.

The force of the tires dropping down caused the lift to fall forward and throw the worker to the ground, where he suffered fatal injuries. Investigation revealed that the lift, a rental unit, was provided with safety manuals and a Manual of Responsibilities outlining the type of terrain on which the unit should be operated. They clearly stated that the scissor lift should only be used on level ground.

SO HOW WOULD PLANNING HELPED IN THIS CASE?

https://www.clicksafety.com/ucp/images/pdf/courseware/Case%20Study%201.pdf

Case Study: Steel Worker – Failing To Plan

- There is no mention of his supervisor walking the job site with the worker “assuming” since he had 40 years on the job he would follow safety protocols and walk the job site.
- The rental company supplied Manual of Responsibilities was not followed.
- The scissor lift was extended in the air and not down in a travel position. A high center of gravity, a drop of tires into a ditch and not letting common sense prevail caused this problem.

TAKING A FEW MINUTES TO PLAN OUT THE JOB WOULD HAVE PREVENTED THIS FATALITY

Applying What We Have Learned

Lets run through a few typical tasks that you are constantly faced with and make a decision on which to do first.

Interactive Exercise: What Comes First?

Monday morning, has a call has come in from a deputy sheriff that a STOP sign is down at an intersection of two county roads in your precinct. You also have a call about vandalized mail boxes on a county road and need to be reinstalled. Which one do you do first? You have only yourself and one crew member to do the job.

OR

Interactive Exercise: What Comes First?

Hopefully you answered the STOP sign. Having an intersection that has been signed with STOP signs that are suddenly not there will produce a SAFETY hazard. Drivers of the road that are not familiar with it will not know to stop setting up a potential crash at the intersection.

Remember – SAFETY is always the trump card on prioritization of work tasks.

Interactive Exercise: What Comes First?

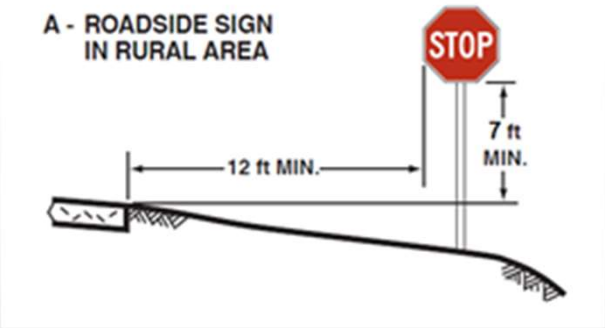
You are driving down one of your roads that you have not been down for the past 2 weeks and see this. There are two items that need immediate addressing. What are they and which one should come first?

Interactive Exercise: What Comes First?

Hopefully you answered the washed out culvert. In this particular case heavy rain is in the forecast for the next two weeks and the culvert could be a complete loss if not immediately addressed.

You ask what is wrong with the STOP sign? The Texas Manual on Uniform Traffic Control Devices (TMUTCD) (the manual that all counties and municipalities must follow) states:

Section 2A:18 Mounting Height: The minimum height, measured vertically from the bottom of the sign to the elevation of the near edge of the pavement, of signs installed at the side of the road in rural areas shall be 7 feet (see Figure 2A-2).



Interactive Exercise: What Needs To Be Done?

What should be done here and why? Signage, mowing, center stripe, edge maintenance?

HINT: This road is posted at 50MPH

Interactive Exercise: What Needs to be Done?

Hopefully you answered hard left turn coming up. The TMUTCD Part 5 Low Volume Roads 5C.02 advises the use of a W1-1 Horizontal Alignment Sign "where engineering judgment indicates a need to inform the road use of a change in the horizontal alignment of the roadway."

If you were traveling this road at night at 50 MPH, wouldn't you want to know about that hard left turn coming up? Just a thought.

W1-1

Services TxLTAP Offers You at No Cost to Prioritize, Plan and Schedule for Success

- On-site training in:
  - Heavy equipment
  - Safety
  - Flagger & Work Zone
  - Traffic Control
  - TMUTCD
  - Drainage Issues
  - Leadership & People Skills
  - Project Management
- Workshops on:
  - Road Crew Safety
  - Pavement Preservation
- On-site Technical Assistance
- Lending Library
  - Equipment
  - Safety DVD's
- Customized Workshops can be developed and delivered on-site

Technical Assistance

Technical Assistance On-Site Visits Provide

- Phone visit to discuss history and magnitude of the issue
- On-site inspection of the problem
- TxLTAP Subject Matter Expert (SME) will document the problem and take photographs of the problem for reference
- Discuss ideas and options that local representatives have considered
- Attempt to reach a consensus to a viable solution
- SME will prepare a comprehensive report of the visit and will send to the TxLTAP manager who will forward to the parties requesting the assistance

Technical Assistance

Do you have roads that look like this? If so, we can help! We have several consultants on call with numerous years of real-world experience who can help you overcome challenges.

Our consultants have experience in:

- Road maintenance (asphalt, cement, chip seal and all-weather)
- Drainage issues
- Equipment maintenance
- Signage and roadway markings
- Safety (roadway, equipment operation, office, all aspects)
- Utility locating
- Work Zone Planning
- Contract administration
- Construction and maintenance inspection
- Workforce development planning and implementation
- Project Management planning and implementation

Equipment Lending Library

You can find these items on our website http://www.txltap.org/.

Each piece of equipment in our equipment lending library will have a photo and a short description of the item.

There are 32 pieces of equipment. You can also email or call TxLTAP for assistance. The following slides show some examples of the equipment available for checkout.

AMS 300.00 Dual Mass Dynamic Cone Penetrometer

Developed by the Army Corps of Engineers, Dynamic Cone Penetrometers (DCPs) provide a low-cost, efficient test method for quickly determining in-situ CBR values of pavement base, subbase and subgrades. They can readily be used for depths up to 30" and up to 6' with optional drive rods and extensions.

Road Vista Model 922

Field Retroreflectometer

Ensures a cost effective, safe, absolute means of meeting the minimum retroreflectivity requirements for traffic signs.

Rieker Electronics Inc. Digital Inclinometer

Inclinometer is an instrument for measuring angles of slope and inclination of an object with respect to its gravity by creating an artificial horizon. It is also known as a tilt sensor, tilt indicator, slope meter, slope gauge, gradient meter, gradiometer, level gauge & level meter.

MetroCount Road Pod VT

The Road Pod VT is a dual air-sensor traffic data logging unit. For short-term operations, the counter is powered by a user-replaceable alkaline battery pack, supporting up to 4 years of continuous data collection. When used for semi-permanent applications, an additional solar panel with SLA battery can power the unit.

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Thank you for attending today!