Every Day Counts (EDC)
Arizona Local Public Agency Stakeholder Council
Meeting Minutes

DATE: Thursday, March 14, 2019

TIME: 10:00AM - 2:00PM

LOCATION: Maricopa Association of Governments (MAG) – 302 N. 1st Ave, Phoenix, AZ 85003

WELCOME AND INTRODUCTIONS

Welcome by Mark Henige.

RECAP AND SUMMARY OF SEPTEMBER 27, 2018 MEETING AND TOPICS

Meeting recap by Mark Henige.

- EDC Innovation of the Month Videos –Pavement Preservation
- EDC Fact Sheet Pavement Preservation Handout – When, Where and How.
- Asphalt and Pavement Innovation Presentation, Kevin Robertson ADOT
- How to Avoid the Right-of-Way (ROW) Zombies – Introduction
- FHWA Updates
- Project Closeout Update – Dashboard to access information in process/development.

SEPTEMBER 27, 2018 MEETING – FOLLOW UP ITEMS

Action Required by ADOT Staff:

1. ROW to follow up on local ROW acquisitions. – COMPLETED
2. LPA to meet with PMG to discuss PMG attendance at Technical Advisory Committee (TAC) meetings. – COMPLETED/WILL ATTEND 1 PER YEAR
3. LPA to research sharing ADOT bridge and pavement data. – COMPLETED
4. Discuss internally, can best results from our pavement testing data be sent to other agencies. https://www.azdot.gov/business/engineering-and-construction/construction-and-materials/manuals/materials-test-manual – COMPLETED
5. Patrick Stone to conduct a survey…what kind of reporting do the LPAs want? – NOT COMPLETED
6. Invite local agencies and TAC members to EDC meetings. – COMPLETED

Action Required by EDC attendees:

1. Share the When, Where and How Fact Sheet with their TAC – RECAP/ACTION
2. ROW planning scheduling homework/information. – RECEIVED 3
3. Invite local agencies and TAC members to EDC meetings. – FOLLOW UP

PARTICIPANT FEEDBACK AND OPEN DISCUSSION

Mark discussed the EDC meeting purpose, initiative and strategy.

- What is EDC and what can it do for our local agencies.
- How can local agencies better deliver federal aid projects?
- How can we make federal projects more cost effective?
- The original EDC team determined 5 areas of major focus of these quarterly meetings:
    - Finance
    - Environmental
    - Right-of-Way
    - Administration
    - Other
- We want feedback for topics and meeting ideas.
- Visit the federal EDC website as they have a lot of information on interesting topics.
    - https://www.fhwa.dot.gov/innovation/everydaycounts/
    - Many of the topics we select at our EDC meetings complement national level initiatives.
- Steve O'Brien, Project Management Group Manager has committed to ADOT project managers attending at least 1 technical advisory committee (TAC) meeting per year.

HOW TO AVOID THE RIGHT-OF-WAY (ROW) ZOMBIES

Presentation by Matt Tolman, ADOT Right-of-Way Coordinator.

- Not managing the ROW process appropriately can stall a local public agency project.
- A project needs to have authorization by May 15, so you must be proactive to meet this fiscal year deadline.
- ROW projects should be delivering at 20/30/30/20. Meaning the number of projects is divided by each quarter. Since 2015 there has been a struggle to achieve 20/30/30/20 delivery schedule.
- Instead of ROW the term is now referred to as Real Property Interest.
- ROW should be defined at 60% plans.
- With good design and planning at 60%, there will be fewer issues with a project.
- Use the planning tool when planning a ROW schedule.
- Allow for council action and delays when developing a ROW schedules.
- Start the application process early. Especially when dealing with state land and utilities.
- Involve the ADOT ROW staff early so they are aware and engaged with the project.
- Stay focused, be assertive and follow through.

EDC VIDEO OF THE WEEK

Collaborative Hydraulics: Advancing the Next Generation of Engineering (CHANGE)
https://www.youtube.com/watch?v=pgIL3oCZ2N8&feature=youtu.be

COLLABORATIVE HYDRAULICS – 2-D MODELING

Discussions lead by Steve Olmsted, NEPA Assignment Manager, ADOT Environmental Planning Group (EPG).

- Arizona is one of five states to institutionalize Hydrologic Engineering Center (HEC) River Analysis System (RAS) models.
- The presentation shared the state of the practice is in regards to next generation water modeling and specifically the readily available use of conducting water shed, runoff drainage and hydraulic engineering using 2-D hydraulic modeling.
- An important note from a technical standpoint is that the long standing 1-D approach has now given way to a next generation option in SRH 2-D. A BOR developed, FEMA and FHWA adopted. ADOT has been piloting and now using as part of design analysis where appropriate.
- There is a pilot project going on right now Carrow Stephens US93

JUNE MEETING PRESENTATION TRAILER INTRODUCTION – 3-D DIGITAL DELIVERY – MODEL BASED DESIGN AND CONSTRUCTION (MBDC)

- Kimley-Horn Project Manager to attend in June. Discussion will include 3D modeling, local delivery without plans, and a Utah Department of Transportation case study for delivery of a local project.
- Why 3-D Digital Delivery, instead of a traditional plan set?
    - Traditional plan set delivery involves creating a 3-D model of the roadway, then converting it to a 2-D plan set. The contractor then takes those plans and creates their own separate 3-D model to run automotive machine guidance grading equipment.
    - 3-D digital Delivery takes the 2-D plans (middle man) out of the process to reduce time, cost, and risk for the designer and contractor.
    - By providing the "Plans" as a digital model vs paper, we can utilize the data for maintenance, planning, and asset management purposes.
    - Digital delivery is a step to linking all phases of a project life cycle with data management.

WORKING LUNCH – VIDEO OF THE MONTH – VIRTUAL INVOLVEMENT

https://www.fhwa.dot.gov/planning/public_involvement/vpi/

Virtual Public involvement video shown to the EDC team.

FEDERAL HIGHWAY ADMINISTRATION (FHWA) UPDATES:

Discussions lead by Ed Stillings, FHWA

- FHWA Stewardship Agreement with ADOT requires Financial Integrity Review and Evaluation (FIRE) reviews to occur.
    - This year FHWA looked into how certification acceptance (CA) agencies manage authorization, advertisement and award. FHWA met with all 8 CA agencies in February.
    - They want to determine how to avoid delays and keep projects off the inactive list with timely invoicing.
- EDC Western Region Workshop
    - The council had their semi-annual meeting and is moving forward with 10 new initiatives.
    - Visit their site at https://www.fhwa.dot.gov/innovation/everydaycounts/edc_5/

- INFRA Grants
  - Yavapai County received a grant and will be a direct recipient for SR 250 project.
  - Ed Stillings will be the project manager on the design bid build project.
- BUILD Grants
  - Pinal County applied for a BUILD Grant.
- Arizona received funding for MAG, PAG and Sun Corridor to develop a value impact analysis. Amy St. Peter will oversee the project for MAG.
- Jennifer Ellison will be the new Environmental Program Manager starting after Roads and Streets in April. Susan Webber will transition to helping ED Stillings with local public agency projects.

FINANCIAL MANAGEMENT SERVICES (FMS) DISCUSSION

No financial discussion.

HIGHWAY SAFETY IMPROVEMENT PROGRAM (HSIP)

Discussion led by Larry Talley, ADOT HSIP Coordinator.

- All agencies can apply for funding of HSIP projects. There is no longer a financial project cap, so the project will be fully funded.
- May 3, 2019 is the deadline for HSIP applications for FY 23/24. For fiscal year 23/24 there is $35 million available for each year. HSIP applications for ADOT review must be submitted by April 1, 2019.
- A 5% inflation factor has been added to the cost estimate tool for 2023.
- HSIP funds cannot pay for salaries of staff, but can cover the costs of consultants.

PROJECT MANAGEMENT GROUP (PMG) UPDATES

Discussion led by Jennifer Acuna, PMG Project Manager.

- PDOC is up and running. Expect phone calls from consultants requesting information on local projects.
- The process will be similar to advertising projects.
- 3 person panel with 2 weeks of review of the statement of interest and 2 weeks for the selection of a consultant.
- At the pre-scoping meeting the team (including LPA) needs to decide on who will be responsible for handling communications.
- Locals can request advertisement information from C&S to post on their local job boards.
- PMG also presented the latest project management tool designed to be the one-stop shop for both the project manager and the project team where information regarding the project team, schedule, hours, dates, emergency contact information, risk registers, etc. can be obtained. This Project Workplan picked up all of the project information documents such as the framework form, team listing, design hours estimate were combined into one workbook. This workbook is a living document that is updated by the project manager and can be provided to the LPA at their request. The EDC members present at the meeting requested that PMG present more information regarding the Project Workplan at the next EDC Quarterly meeting.

ROUNDTABLE:
No roundtable discussion.

ANNOUNCMENTS - UPCOMING EDC MEETINGS

- June 13, 2019
- September 12, 2019
- December 12, 2019

MARCH 14, 2019 MEETING – FOLLOW UP – ACTION ITEMS

Action Required by ADOT Staff:

- Pavement preservation fact sheet sent to Michael Bryce, Graham County.
- Pavement preservation presentation sent to Jeff Faglie, Sierra Vista.
- ROW Training.
- Traffic to review applications submitted by April 1, 2019.

Action Required by EDC attendees:

- Share with member agencies:
  - Development of ROW schedule discussion.
  - Share 2-D presentation.
- Invite member agencies to the June 2019 meeting. The discussion will be 3-D Digital Delivery Model Based Design and Construction.

ADJOURN

- March 14, 2019 at 2:10 pm

ATTACHMENTS

- Meeting Agenda
- Meeting Attendees
- ROW Presentation
- ADOT TAM Risk Management
- Collaborative Hydraulics Fact Sheet
- US 93 Carrow to Stephens Project Presentation
- Public Involvement Fact Sheet
- HSIP Presentation

Everyday Counts - Arizona Local Public Agency Stakeholder Council

Thursday, March 14, 2019 • 10:00 PM – 2:00 PM

Maricopa Association of Governments (MAG) • 302 N. 1st Ave, Saguaro Conference Room • Phoenix, AZ 85003

Completion of this sign-in sheet is completely voluntary and helps the project team keep an accurate record of meeting attendees. Under state law, any identifying information provided below will become part of the public record and, as such, must be released to any individual upon request. Please print clearly.

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ADOT

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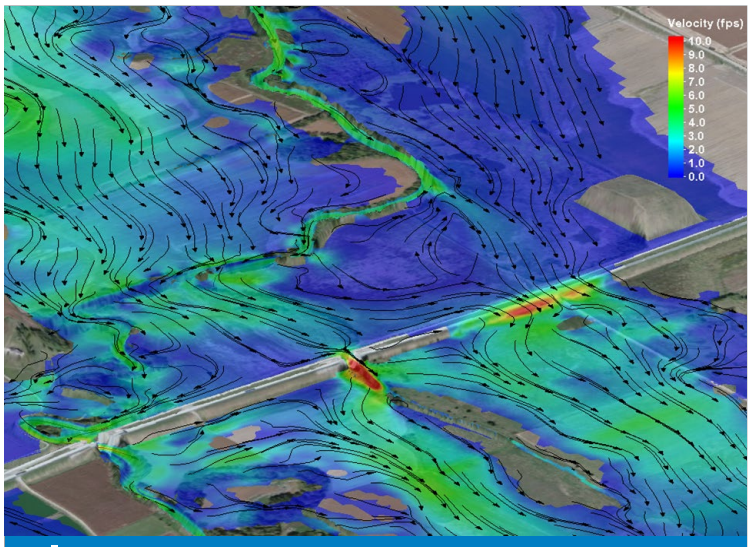
Mark Henige	Adot		
Jennifer Catapano	Adot		
Ed Stillings	FHWA		

Collaborative Hydraulics: Advancing to the Next Generation of Engineering (CHANGE)

Next-generation hydraulic tools improve understanding of complex interactions between river or coastal environments and transportation assets, enabling better design and more efficient project delivery.

The current generation of hydraulic modeling tools – primarily one-dimensional (1D) modeling – has been in use for nearly 60 years. User interfaces have greatly improved during this time, but the underlying techniques have remained the same.

These modeling techniques apply several simplifying assumptions that can lead to overly conservative, inadequate, or inaccurate results and are insufficient to meet new requirements. For example, in recent years, resource agencies have increased their focus on assessment of environmental impacts associated with river crossings. As a result, hydraulic engineers have become responsible for demonstrating that impacts have been avoided or minimized to the extent possible. Traditional hydraulic tools do not effectively support these levels of inquiry and analysis.



The latest 2D hydraulic modeling tools offer better representations that provide planning and design teams with better data, leading to improved project quality.

The next generation of hydraulic engineering tools, particularly two-dimensional (2D) modeling and graphical visualization features, allows users to create better representations of the often complex interaction between transportation assets and the riverine or coastal environments. These representations provide the planning and design team with better data with which project quality can be improved.

The technology can be used to locate and illustrate patterns of flow discharge, water surface elevations, depth, velocity and shear stress. The results allow for more accuracy in estimating flow conditions and flow paths, evaluating hydraulic considerations (including floodplain extent based on Executive Order 13690: Establishing a Federal Flood Risk Management Standard) and assessing climate change or extreme weather event scenarios.

These tools also provide realistic 3D graphical representations of anticipated hydraulic conditions, aiding the hydraulic design as well as structural, geotechnical and environmental design components. The 3D representations enhance communication with regulatory bodies and other stakeholders, improving collaboration and ultimately reducing project delivery times.

Next-generation hydraulic modeling tools represent a significant evolution in hydraulic modeling theory and practice, with real potential for reducing environmental, regulatory, engineering and other impediments to project delivery. The results can significantly improve the ability of highway agencies to design safer, more cost-effective and resilient structures on waterways.

Collaborative Hydraulics: Advancing to the Next Generation of Engineering (CHANGE)

STATE OF THE PRACTICE

Technology developments in recent years have led to an expanding market of hydraulic modeling programs and tools that are available to the transportation community and can be applied nationally. While 1D modeling is the dominant practice nationwide, almost half of the country's state departments of transportation are currently either exploring, evaluating or using 2D bridge hydraulic modeling.

The Federal Highway Administration (FHWA) has recognized the benefits of 2D modeling for the safety of the traveling public and in the resilience of transportation infrastructure. This has resulted in guidance and training encouraging its use, including Hydraulic Design of Safe Bridges (HDS 7), Evaluating Scour at Bridges (HEC-18), and Two-Dimensional Modeling of Rivers at Highway Encroachments (FHWA-NHI-135095).

Through round four of Every Day Counts (EDC-4), the FHWA plans to provide additional resources to help states advance their state of practice, including training on modeling software use and how to communicate the results to stakeholders and customers effectively, technical guidance resources on best-practice modeling techniques, user forums and other means of peer exchange for modelers and reviewers, and technical modeling assistance with a limited number of design projects.

BENEFITS

- **Improved Quality and Resiliency.** Better representations provide planning and design teams with better data, leading to improved project quality.
- **Enhanced Collaboration.** 3D graphical visualizations derived from 2D modeling offer better tools for communicating the often complex interaction between waterways, the transportation infrastructure, and the surrounding environment.
- **Streamlined Delivery.** Improved collaboration through 2D and 3D visualizations offers real potential for reducing environmental, regulatory, engineering and other impediments to project delivery.

Applications of Next-Generation Hydraulic Design Tools

- complex bridge crossings
- analysis of bridge options
- evaluation of complex floodplain geometry
- flood risk assessment
- flood mapping
- channel restoration
- fish habitat analysis
- sediment transport analysis
- bridge scour analysis
- channel stability analysis
- scour countermeasure analysis

RESOURCES

EDC-4 CHANGE:
https://www.fhwa.dot.gov/innovation/everydaycounts/edc_4/change.cfm

FHWA Hydraulic Engineering:
http://www.fhwa.dot.gov/engineering/hydraulics/

EDC-4 Summit Breakout Session: Fall 2016
https://www.youtube.com/watch?v=Hox3wufQeME

For additional information, please contact:

Scott Hogan
FHWA Resource Center
720-576-6026
Scott.Hogan@dot.gov

U.S. Department of Transportation
Federal Highway Administration

Every Day Counts (EDC), a State-based initiative of FHWA's *Center for Accelerating Innovation*, works with State, local and private sector partners to encourage the adoption of proven technologies and innovations aimed at shortening and enhancing project delivery.

Right of Way Scheduling

How to keep your projects from becoming ZOMBIE projects?

Right of Way Scheduling

1. State receives a disbursement of money “Federal Dollars.”
2. That money is divided up between agencies.
3. Money not used when programed is at risk of being lost.

What has ADOT done to mitigate, limit, or prevent putting funding at risk?

1. ADOT established a date by which projects must be submitted for authorization prior to the end of ADOTs fiscal year.

2. Arizona Management System

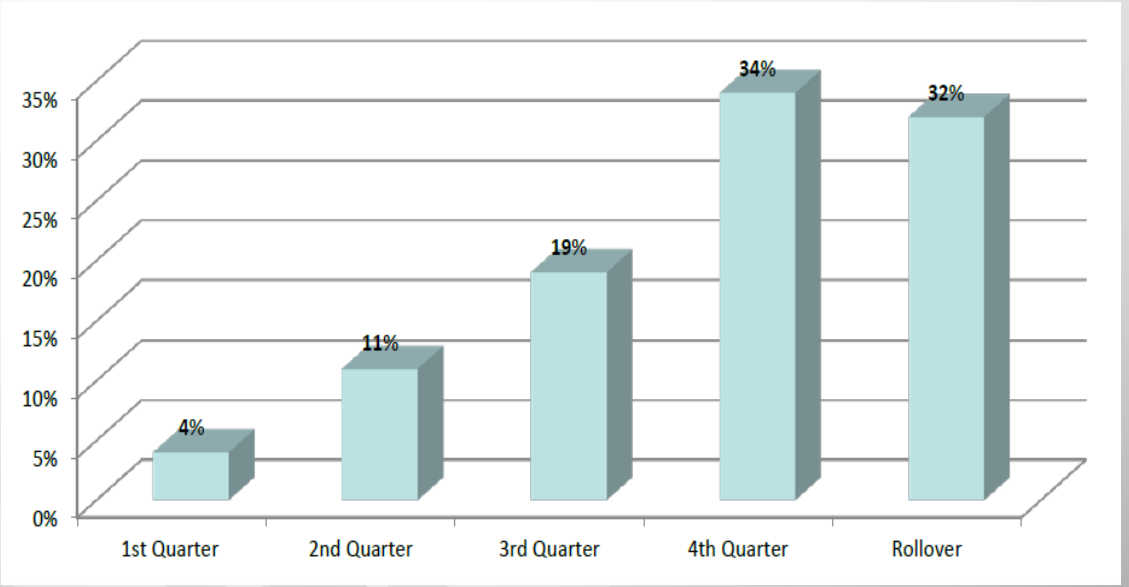
3. Set up a 20-30-30-20 guidelines

WHY?

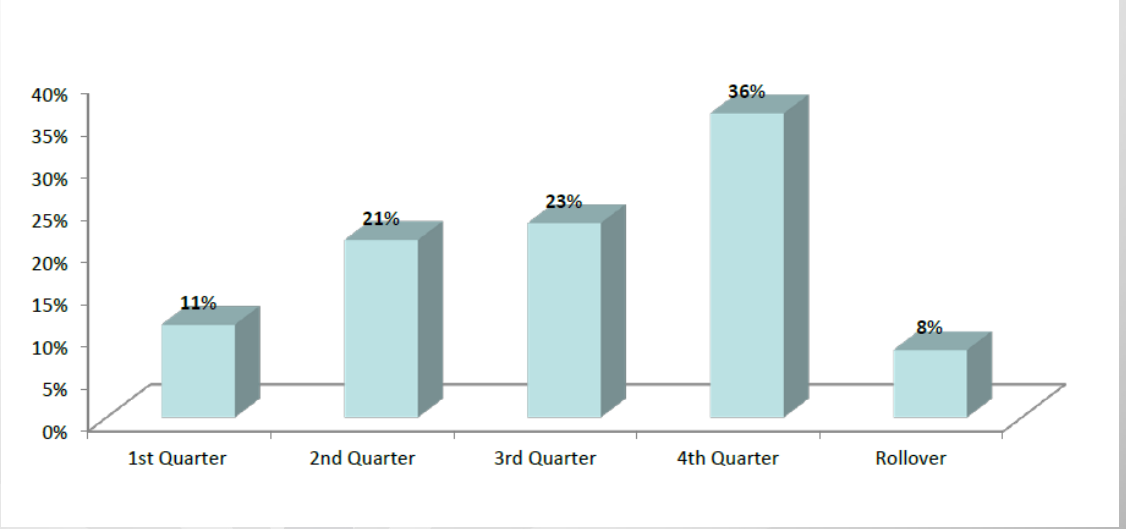
It allows ADOT time to substitute projects that are ready to deliver but just need funding.

Allows time for the funding to be borrowed or lent by ADOT or LPA agencies through their prospective COGS & MPOS.

Fiscal Year 2015
Zombie Outbreaks
20-30-30-20

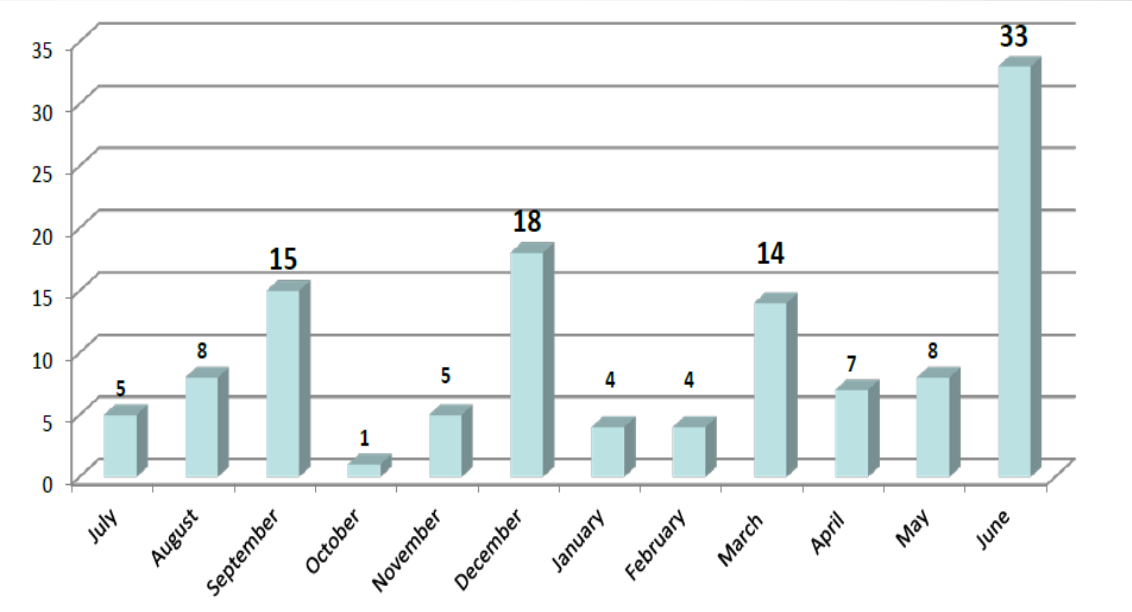


Fiscal Year 2017
Zombie Outbreaks
20-30-30-20

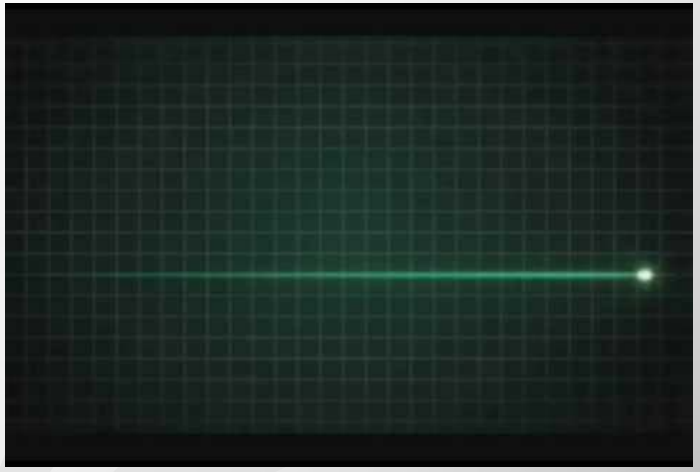


Fiscal Year 2018
Zombie Outbreaks
20-30-30-20

State, Local, CA, RR & Re-Advertisement



Where do we want to get too? We want our projects to have a heart beat. We want them to live and not become Zombie Projects.



Zombie Project

So how many of you know of a project that has become infected with a Zombie Virus because of right of way (scientific name RPI)?

What would you say if I told you there was vaccine to help stop the spread of a Zombie Infection?

Since the last EDC meeting a sample vaccine was sent out and LPAs were asked to submit a sample with the results after it was used. *(RW Schedule)*

The results are not good and show that more attention is needed. I think we will likely continue to see outbreaks from the results.

Zombie Project Vaccine

Side Effect of Vaccine!

Better Planning

May cause heartburn for Council Member & Management. (Approvals earlier for RW needs and permissions.)

May cause indigestion for Public Work Directors & Planners. (Better planning at initiation of projects)

May cause profuse sweating for Project Managers & Engineers. (Identify RW needs by 60% design plans and stopping project creep after submittal.)

May cause extreme fatigue and drowsiness for Acquisition Agents. (Agents will need to be involved during preliminary engineering planning & plan development stages. PA, 30%, 60%, preparation of acquisition & relocation plans.)

May cause allergic reaction in Attorneys. (Need to file condemnation cases sooner than later and will have to work within project schedule.)

24 Case Samples LPA Section

Question - What do you think the delays were due too?

A) Right of Way or Real Property Interest Acquisitions.

B) Planning / Scheduling

C) Scope Creep

D) None of the Above

24 Case Samples LPA Section

Question - What do you think the delays were due too?

A) Right of Way or Real Property Interest Acquisitions.

B) Planning / Scheduling

C) Scope Creep

D) None of the Above

Three fold conclusion:

1) A lack of understanding of the Right of Way Process.

2) A lack of planning /Scheduling to allow the RW process to be complete.

3) Project creep.

What Can Be Done?

1) Use a scheduling tool that list the steps your agency must go through for an acquisition to be completed. Include the best and worst dates.

2) Bring in acquisition agents who will be responsible for acquiring the necessary real property interest on to the team as soon as possible.

3) Identify your RW needs early in the process. Don’t change the agent unless absolutely necessary.

4) All RW needs should be identified no later than 60% design.

5) As soon as you know there will be an impact to a parcel, order the title work and obtain ownership information.

6) Order your appraisal early if you need them. There is no need to wait for NEPA clearance. What you CAN'T do is start negotiations with a property. The other caution I say is wait until two or three months out from final NEPA approval so that the appraisal doesn't have to be updated. Usually 2 months is good.

7) If federal funds are going to be used for RW, make sure that your request for RW authorization is submitted as soon as you have NEPA Clearance. This can take about 30 days.

8) While federal funds have been requested, have your RW agent prepare the offer packages so that they can MEET with the property owner as soon as you have authorization to spend RW funds.

9) Once offers have been made, follow up with property owners weekly if they didn't sign when you met with them. You don't have to wait 30-days for a follow-up.

10) Open escrow as soon as property owner has signed the purchase documents. Don't wait 30-60 days to do so. The escrow process can take 90 days or more.

11) If you can't reach a negotiated settlement and it has been 30-days since the offer was made, file for condemnation. You can always continue to negotiate up until the order of immediate possession (OIP) hearing.

12) Tell the attorney handling the condemnation case the date you need the OIP by and hold them to it as much as possible. *(Yes, they can't control the court calendar)*

13) Review the RW schedule regularly. When changes occur that impact design let others on the team know the impact to RW schedule.

It is always easier to advance a project then it is to delay a project. Don't put a project in jeopardy or at risk of losing the funding because of RW delays.

So what is the best way to avoid a Zombie Project?

Properly Scheduling of Right of Way

Best Worst Case Scenario Planning Tools!

	Best Case (In Days)	Date	Worst Case	Date
1 - 30% Plans Received	0		0	
2 - Prepare Acquisition/Relocation Plan	1	(Date)	4	(Date)
3 - Title Reports Requested	14	_____	30	_____
4 - 60% Plans Received R/W Defined	0	_____	0	_____
5 - Legal Description Prepared and Received	14	_____	30	_____
6 - Appraisal Started & Completed	30	_____	90	_____
7 - Appraisal Review Started & Completed	14	_____	30	_____
8 - Appraisal Correction (if needed)	7	_____	14	_____
9 – NEPA Clearance	0	_____	0	_____
10 – Federal Authorization (if using Federal Funds)	30	_____	75	_____
11 - Just Compensation Set, Offers Prepared, Appointments Set	7	_____	14	_____
12 - Offers Presentation to Owners (Start 30-Days)	7	_____	14	_____
13 - Owners Agree & Sign or File for Condemnation (30-Day End)	1	_____	30	_____
14 - LPA Council Actions	30	_____	45	_____
15 - Escrows Opened & Closed (Lien releases can take up to 90-days)	30	_____	90	_____
16 - Prepare, File and obtain OIP (condemnation)	90	_____	120	_____
17 - Prepared & Submit Files for Review to ADOT LPA Coordinator	7	_____	14	_____
18 - ADOT LPA Coordinator Review files & Prepared Right of Way Clearance	1	_____	4	_____

2, 3, Can be done at that same time but usually doesn't happen until 1 is completed.
5 – 9, Happen after R/W requirements are known
12, Negotiation can't start until after 9 (NEPA Clearance has happened)
15, Lien release and consents from lien holders can take from 90 – 120 days and have additional requirements and cost.

Critical Path Method

DRAFT (11/01/16) - patoni

ANY PROJECT-estimated Right of Way Acquisition Process-multiple parcels

HELP

(change above to date created-author)

(change above line to your specific project description)

Start Date: 11/01/16 (change to appropriate start date)

Finish Date: 03/30/20 (finish date will be automatically calculated)

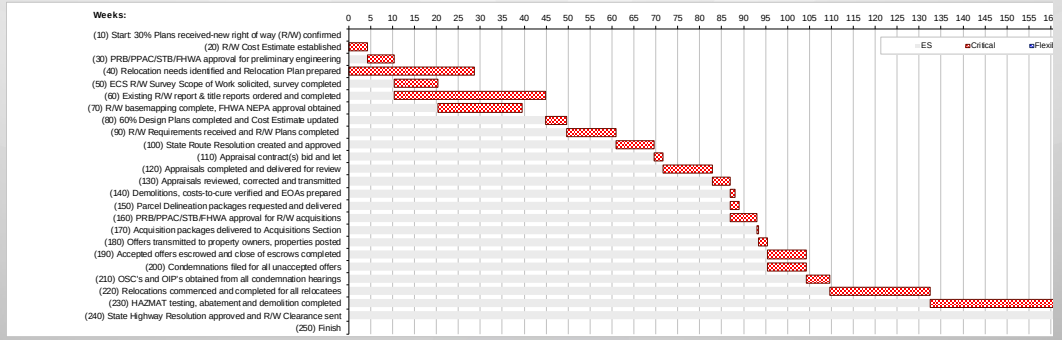
Weeks to Completion: 177.97 (CAUTION! If the project R/W requirements affect numerous parcels, the "n times should be appropriately increased for those relevant tasks-delete me

Times (in Weeks)

Time Distribution: Triangular

ID	Task Name	Predecessors (Enter one ID per cell)					O (min)	M (most likely)	P (max)	Duration (exp. time)	ES	EF	LS
10	**Start: 30% Plans received-new right of way (R/W) confirmed**									0.00	*0.00*	0.00	0.00
20	**R/W Cost Estimate established**	10					1	4	8	4.33	0.00	4.33	0.00
30	**PRB/PPAC/STB/FHWA approval for preliminary engineering**	20	10				5	6	7	6.00	4.33	10.33	0.00
40	**Relocation needs identified and Relocation Plan prepared**	10					8	26	52	28.67	0.00	28.67	0.00
50	**ECS R/W Survey Scope of Work solicited, survey completed**	30	10				8	8	14	10.00	10.33	20.33	0.00
60	**Existing R/W report & title reports ordered and completed**	30	10				26	26	52	34.67	10.33	45.00	0.00
70	**R/W basemapping complete, FHWA NEPA approval obtained**	50	10				13	19	26	19.33	20.33	39.67	0.00
80	**60% Design Plans completed and Cost Estimate updated**	70	60	50			2	4	8	4.67	45.00	49.67	0.00
90	**R/W Requirements received and R/W Plans completed**	80					8	12	14	11.33	49.67	61.00	0.00
100	**State Route Resolution created and approved**	90					8	8	10	8.67	61.00	69.67	0.00
110	**Appraisal contract(s) bid and let**	100	90				1	2	3	2.00	69.67	71.67	0.00
120	**Appraisals completed and delivered for review**	110	100	90			4	12	18	11.33	71.67	83.00	0.00
130	**Appraisals reviewed, corrected and transmitted**	120					2	4	6	4.00	83.00	87.00	0.00
140	**Demolitions, costs-to-cure verified and EOAs prepared**	130					0.2	1	2	1.07	87.00	88.07	0.00
150	**Parcel Delineation packages requested and delivered**	130					1	2	3	2.00	87.00	89.00	0.00
160	**PRB/PPAC/STB/FHWA approval for R/W acquisitions**	130	110	90			5	6	7	6.00	87.00	93.00	0.00
170	**Acquisition packages delivered to Acquisitions Section**	160	140	130			0.2	0.4	1	0.53	93.00	93.53	0.00
180	**Offers transmitted to property owners, properties posted**	170	160	150	140	100	1	2	3	2.00	93.53	95.53	0.00
190	**Accepted offers escrowed and close of escrows completed**	180					4.3	8	14	8.77	95.53	104.30	0.00
200	**Condemnations filed for all unaccepted offers**	180					4.3	8	14	8.77	95.53	104.30	0.00
210	**OSC's and OIP's obtained from all condemnation hearings**	200	180	160	100		2	4	10	5.33	104.30	109.63	0.00
220	**Relocations commenced and completed for all relocatees**	210	190				4	13	52	23.00	109.63	132.63	0.00
230	**HAZMAT testing, abatement and demolition completed**	220	190				32	36	44	37.33	132.63	169.97	0.00
240	**State Highway Resolution approved and R/W Clearance sent**	230	220				8	8	8	8.00	169.97	177.97	0.00
250	**Finish**	240								0.00	177.97	177.97	0.00

CAUTION!: Times for completion of the Right of Way Acquisition Process will be increased if any revisions of the original 60% Plan impact target parcels!



Transportation Systems Management and Operations (TSM&O)

HSIP CY 2019

Every Day Counts, AZ LPA Stakeholders

Phoenix, AZ

March 14, 2019

Highway Safety Improvement Program
HSIP Goal

- The goal of the HSIP is to achieve a significant reduction in traffic fatalities and serious injuries on all public roads.

- It is intended to drive State HSIP investment decisions by ensuring projects correspond to the emphasis areas and strategies identified in the SHSP.

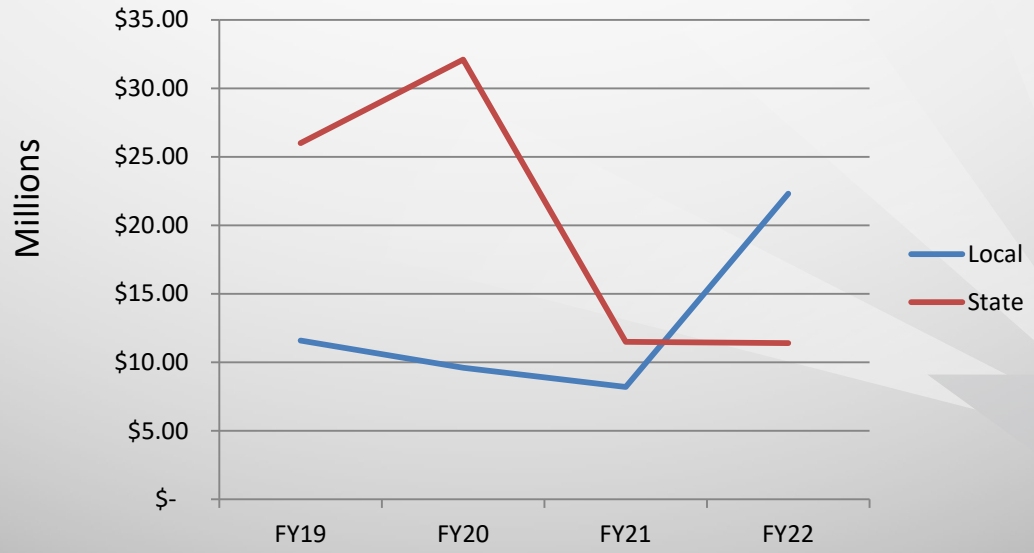
HSIP Governance

The HSIP is legislated under Section 148 of Title 23, *United States Code* (23 U.S.C. 148) and regulated under Part 924 of Title 23, Code of Federal Regulations (23 CFR Part 924). The HSIP consists of three main components, the Strategic Highway Safety Plan (SHSP), State HSIP or program of highway safety improvement projects and the Railway-Highway Crossing Program (RHCP).

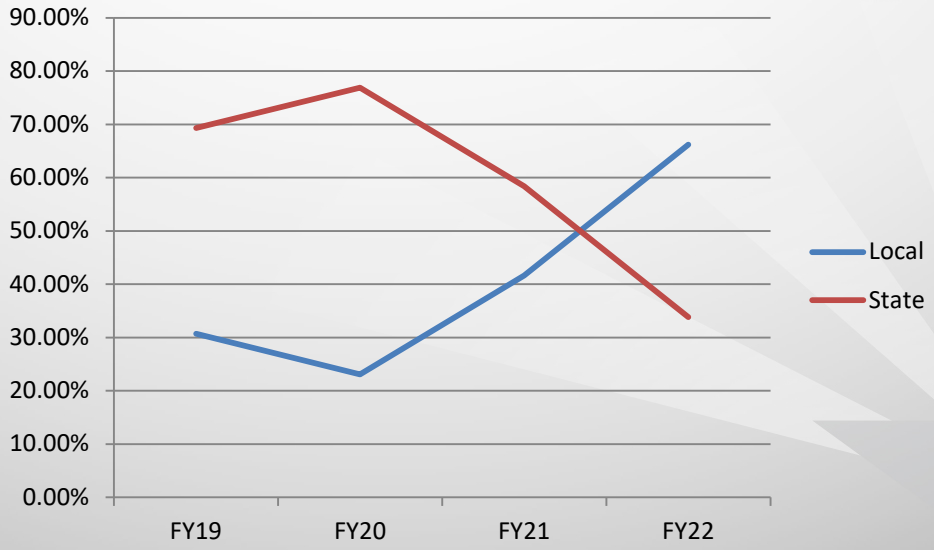
Where Is the HSIP in 2019?

- In CY 17, the 80%/20% split was eliminated and all agencies, both local and State, applied for the available FY19 and FY20 HSIP funding.
- In CY 18, the program called for applications for potential projects in FY21 and FY22
- So how did the local agencies fare?

Available HSIP Funds by FY



Available HSIP Funds by FY



FY 21/22 Average Project Cost Estimate

- Local Agencies was $984,400 (31 projects)
- State Agencies was $1.53 million (15 projects)

B/C Ratio Range

High was 56.6 – Project was Rumble Strips

Low was 3.9 – Install a Median Barrier

Most Frequent Countermeasures

- Centerline & Edgeline Rumble Strips
- Pedestrian Hybrid Beacon
- Speed Feedback Signs/Variable Speed Signs
- Street Lighting
- Raised Medians

Lessons Learned

- Submitting application to TSS for review prior to final submittal pays off
- Don’t underestimate the scope or cost of a project
- Each countermeasure has to meet the B/C ratio requirement
- Make sure the existing support structure can accommodate new countermeasure

Where are we Today?

- January 11, 2019 Call-for-Projects for FY23 and FY24 was issued
- $ 35 million available for each year
- May 3, 2019 all final applications due to ADOT TSS (7 weeks!!)

Changes to FY23 – FY24 HSIP Program

- The comprehensive unit costs for fatal and serious injury crashes have increased in the B/C ratio calculation sheet (Due to statewide actuarial adjustment) ($9,515,371 for fatal crashes and $550,499 for IC crashes)
- The minimum B/C ratio increases to ≥ 2.5 (Due to increased actuarial adjustments)
- HSIP funds can be used for yearly licensing fees for statewide crash data software with ADOT approval
- Total project costs for non-infrastructure projects, i.e. SHSPs, RSAs, licensing fees, etc. are capped at 5% of the yearly SFY HSIP available funds.

Changes to FY23 – FY24 HSIP Program (Continued)

- An inflation factor of 5% has been added to Cost Estimate Tabs to account for estimated inflation between project selection and 2023 (This is only an estimate and ADOT takes no responsibility for ultimate accuracy. Individual agencies may select higher inflationary estimates.)
- Select information technology system equipment can be purchased for new AZTraCS implementation. The $250,000.00 minimum project cost is lowered to $5,000.00 for these projects. (Currently, this funding is on-hold until final ADOT management approval.) (GOHS is first option.)

Local Strategic Transportation Safety Plan (STSP)-Update

- No B/C ratio required
- Cover Letter
- Application
- Cost Estimate (Contract)
- State Location Map
- Framework for STSP and Implementation Plan

Link for HSIP Manual & Application

https://www.azdot.gov/business/tsmo/operational-and-traffic-safety/arizona-highway-safety-improvement-program

Questions?

Thank You!

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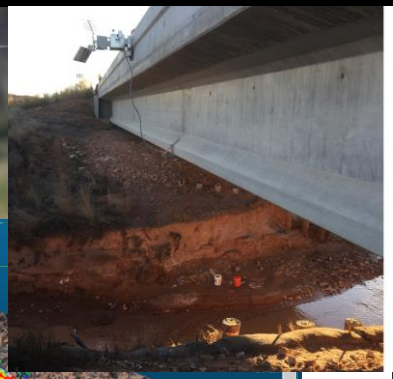
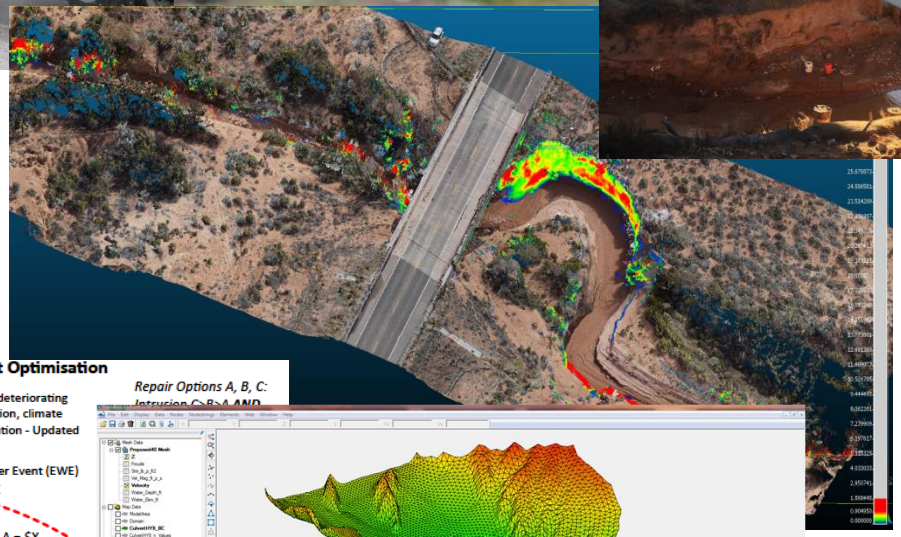
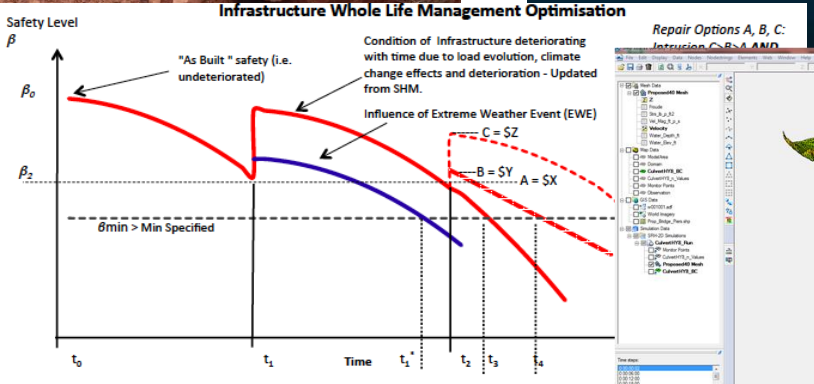
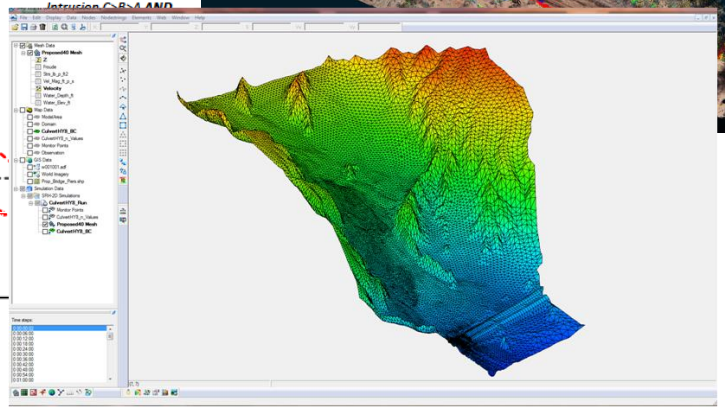
Arizona DOT Infrastructure Resilience
Risk & Resilience in TAMPs
Asset Management, Extreme Weather, and Climate Trends
Blending Risk/Science/Technology/Engineering









Steven Olmsted

Arizona DOT

EDC Arizona Local Public Agency

Stakeholder Council Meeting

March 14, 2019

Arizona DOT Resilience Program

How is ADOT bringing EX W & Climate risk into asset management planning?

Formalize an ADOT Resilience Program - October 2015

Facilitate ADOT's engineering/technical capability to manage risk and long term asset management strategies - the assets (bridges, culverts, pavement, and roadside vegetation/stabilization) in relation to the extreme weather-climate risk of intense precipitation, system flooding, wildfires, wildfire-induced floods, drought-related dust storms, rockfall incidents, slope failures, and measurable climate trends (especially as it relates to precipitation and direct effects of increased surface temperatures) by regions or specific segments emphasized as critical

AASHTO TERI Database idea #884 October 2013
https://environment.transportation.org/teri_database/idea_details.aspx?rid=884
Became NCHRP 25-25, Task 94, *Integrating Extreme Weather into Transportation Asset Management Plans*
http://apps.trb.org/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=3723

ADOT

FHWA / ADOT Asset Management Project

And through the continuous improvement adoption of Life Cycle Planning (LCP)

Overarching EX W & Climate LCP Drivers

- 23 U.S.C. 119, 101(a)(2), 150(a) & (b)(2); 23 CFR Part 667; Order 5520
- All other relevant Asset Management Rule items
- Arizona Management System (AMS LEAN initiatives)
- Guidance on Using a Life Cycle Planning Process to Support Asset Management (2017)
- Guidance on Incorporating Risk Management into Transportation Asset Management Plans (2017)

Arizona DOT specific LCP Drivers

- Execution of grant related tasks, TAMP Agency Risk Register, Resilience Program Risk Register, State Transportation Improvement Plan, ADOT 5-yr Construction Program, Climate Engineering Assessment for Transportation Assets (CEA-TA), Arizona DOT Influence Model - Surface Transportation System Resilience to Climate & Extreme Weather Events

Life Cycle Plan

ADOT

A Climate Engineering Assessment for Transportation Assets (CEA-TA)
Incorporating Probabilistic Analysis into Extreme Weather and Climate Change Design Engineering

Steven Olmsted, Arizona Department of Transportation; Alan O'Connor, Trinity College Dublin; Constantine Samaras, Carnegie Mellon University;
Beatriz Martinez-Pastor, Trinity College Dublin; Lauren Cook, Carnegie Mellon University

Abstract

Transportation infrastructure is a complex system of assets required to deliver a myriad of services and functions. As fiscal constraint for the development and rehabilitation of such structures remains; and endless retrofitting continues to be cost prohibitive; new and novel approaches to long term planning and project development, engineering design, and life cycle assessment are paramount. The management of these infrastructure systems has now evolved from a decentralized, project-based focus, to one that now encompasses enterprise wide endeavors – administration, technology adoption, planning, design, construction, operations and maintenance. In addition, the expansion of risk analysis for extreme weather management and climate change adaptation has complicated the long term delivery of these complex transportation systems. At the 2015 Transportation Research Board (TRB) Annual Meeting, Session 197: *Mainstreaming Climate Change and Extreme Weather Resilience into Transportation*, the Arizona Department of Transportation (ADOT) introduced the challenge ahead for public entities to coordinate a host of known and unknown extreme weather and climate change issues. That challenge – Continue considering the balance between predictable asset deterioration curves, the sudden and unpredictable nature of extreme weather events and long term climate trends, new models for risk assessment and life cycle cost analysis, and appropriate adaptation strategies. This multiple part challenge necessitated a new end-to-end engineering approach to incorporate such current and future risks. At the 2016 Annual Meeting ADOT submitted a paper representing the core of that new approach – a Resilience Program and an ADOT/United States Geological Survey Partnership. That paper was graciously recognized as a best paper by the TRB Special Task Force on Climate Change and Energy. In the spirit of continuing that forward progress – this paper presents the remaining parts needed to develop a new end-to-end engineering-based asset adaption process – a structured sequence to incorporate extreme weather and climate change adaptation into the design engineering process. The paper benefits from preeminent researchers in the two integral, and practice ready, remaining parts – probabilistic modeling for engineering design and infrastructure system design life cycle outcomes for extreme weather and climate change in a transportation engineering setting.

Arizona DOT Resilience Program

Transportation infrastructure is a complex system of assets required to deliver a myriad of services and functions. The expansion of risk development for extreme weather management and climate change adaptation has complicated the long term delivery of these complex transportation systems. In order to develop an innovative approach, the first step was to create a system process that allowed for a shift from a deterministic preset design parameter and/or frequency basis, statistical risk of failure, and historic project and programs budgeting focus – i.e. extreme events not considered – to a probabilistic analysis approach that inputs additional data, vulnerabilities, and considerations not previously considered. In 2015 and 2016 ADOT focused on linking scientific evidence-driven data capture with the design engineering processes through the development of a partnership with the United States Geological Society (USGS). Extensive 2-D/3-D engineered modeling underway.

(CEA-TA) – A Structured Sequence

Identify EX W & CC project and program candidates - *Vulnerability Assessment*

2015 FHWA Pilot Project - The study examined baseline (historical) and potential future extreme weather conditions, focusing on temperature and precipitation variables. Two future analysis periods were selected: 2025 to 2055 (referred to subsequently as 2040, the median year), which reflects the time horizon of ongoing long-range planning efforts, and 2065 to 2095 (2080), roughly associated with the expected design lifespans of some critical infrastructure types, such as bridges. To provide a long term baseline against which to compare the projections, the team also examined temperature and precipitation observations from 1950 through 1999. The report was issued by FHWA in the Spring of 2016.

WHY IS MOVING TO A PROBABILISTIC APPROACH EVEN NEEDED?

This question could cover pages and pages. The short answer is easy. In addition to sustainable transportation attributes, there is growing consensus that if transportation systems are going to incorporate extreme weather and climate change, consideration must be developed that account for hydrometeorology/climatology, hydrology, hydraulics, and hydrodynamics. Since all these areas continue to adopt advanced mathematical modeling approaches, it is therefore logical that transportation systems and projects develop also incorporate these progressions.

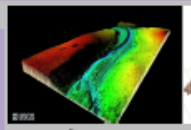
Develop economic analysis process - *Justification*

An economic analysis for the CEA-TA process would consist of using a probabilistic approach to life cycle cost analysis. The life cycle cost of an infrastructure asset such as a roadway or bridge, is the total cost to an agency throughout the asset's useful life. This includes the planning, design, construction, maintenance and decommissioning phases of infrastructure delivery. State DOTs typically initially approach this process without considering risk and uncertainty that future conditions will be different from the past, and assume a uniform distribution of annual maintenance costs and major reinvestment intervals. Long-lived infrastructure must perform under future climate conditions and climate-influenced usage that deviates from the historical data now populating infrastructure economic analysis and asset management models. Climate change impacts, such as sea-level rise, storm surges, changes in precipitation, hotter temperatures, and others are potential vectors of infrastructure failure and should be taken into consideration in infrastructure economic analysis and asset management models.

Resilience Program
Economic Analysis Pilot
US 191 MP 436 to Chinle
PROJECT NO. 191 AP 436 H8676 01 C
FEDERAL AID NO. STP-191-E(214)T
Apache County
Holbrook District

Design probabilistic modeling approach to produce an array of results - *Quality Control*

Optimize operation and maintenance of an increasingly aging stock, which is subjected to evolving loads (e.g. both live loading and climate induced loading). In response to this challenge the past decade has seen increased interest by infrastructure owners and managers in the use of probabilistic methods for the assessment/management of their assets. Employed once a deterministic assessment has rendered a repair/rehabilitate/replace now scenario

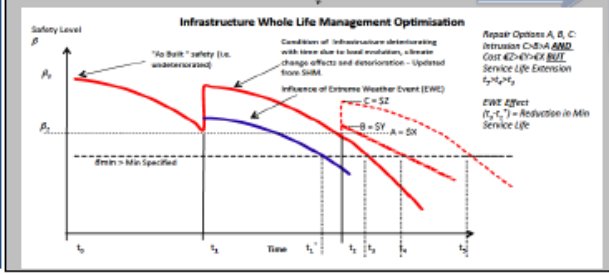


Define limits of simulation runs that incorporates latest science/engineering - *Policy*

Climate models can provide insight into future conditions, projecting air temperature, precipitation, evapotranspiration, and other factors of interest to engineers, at various temporal and spatial resolutions. However, there is a considerable disparity in the outputs provided from climate models for impacts analyses and the inputs needed by engineers for planning and design. These discrepancies include mismatches in temporal and spatial scales, complicated data extraction and preparation requirements, sizeable model, data, and scenario uncertainties, and a lack of direction for the rigorous selection of models for use in different engineering applications.

Innovative change examples:

- Every Day Counts – 4 : Collaborative Hydraulics: Advancing to the Next Generation of Engineering (CHANGE)
- NCHRP 15-61 - Applying Climate Change Information to Hydrologic and Hydraulic Design of Transportation Infrastructure
- NCAR - *The Future Intensification of Hourly Precipitation Extremes* - Andreas F. Prein et al. December 2016
- LiDAR, UAS/UAV, 2-D water modeling, 3-D visualization and animation tools
- Translational organizations to provide rigorous standards for interpretation of climate data, development of a single, simplified user interface that accesses all downscaled data sources, and tools that automatically post-process data based on defined standards



Systematically record location and resilience efforts GIS/TAMP - *Risk Management*

ADOT has been systematically capturing data sets for extreme weather and climate change use through an extensive geographic information system (GIS) effort that will subsequently support ADOT's transportation asset management planning (TAMP). ADOT's studies showed concerns with the climate and extreme weather vulnerability of bridges, culverts, pavement, and roadside vegetation / stabilization. Legislation - Focus in MAP-21 on performance based management and risk-based asset management plans; inclusion of "resilience" in FAST Act.

Develop life cycle models to monitor investment - *BCA/ROI*

Civil infrastructure systems are among the largest local, state and Federal investments, and these infrastructure systems are critical to U.S. economic, environmental and social outcomes. Yet longstanding underinvestment in infrastructure has resulted in the poor condition of much of U.S. infrastructure, with an estimated $3.6 trillion of re-investment needed by 2020. New methods for benefit cost analysis, return on investment studies, and major rehabilitation timeline analyses are needed that incorporate probabilistic approaches, and minimize regret by DOTs under a changing climate. The results of CEA-TA provides that method.

Acknowledgments

The completion of this project would not have possible without assistance from many stakeholders both within and outside ADOT that contributed to this effort. Specifically, the International Symposium - *Transportation Resilience: Adaptation to Climate Change and Extreme Weather Events*; June 16-17, 2016 at the European Commission in Brussels, Belgium that was the catalyst for the transatlantic partnering. The ADOT author wishes to acknowledge the efforts and support of: ADOT State Engineer's Office and ADOT Environmental Planning.

Impacts

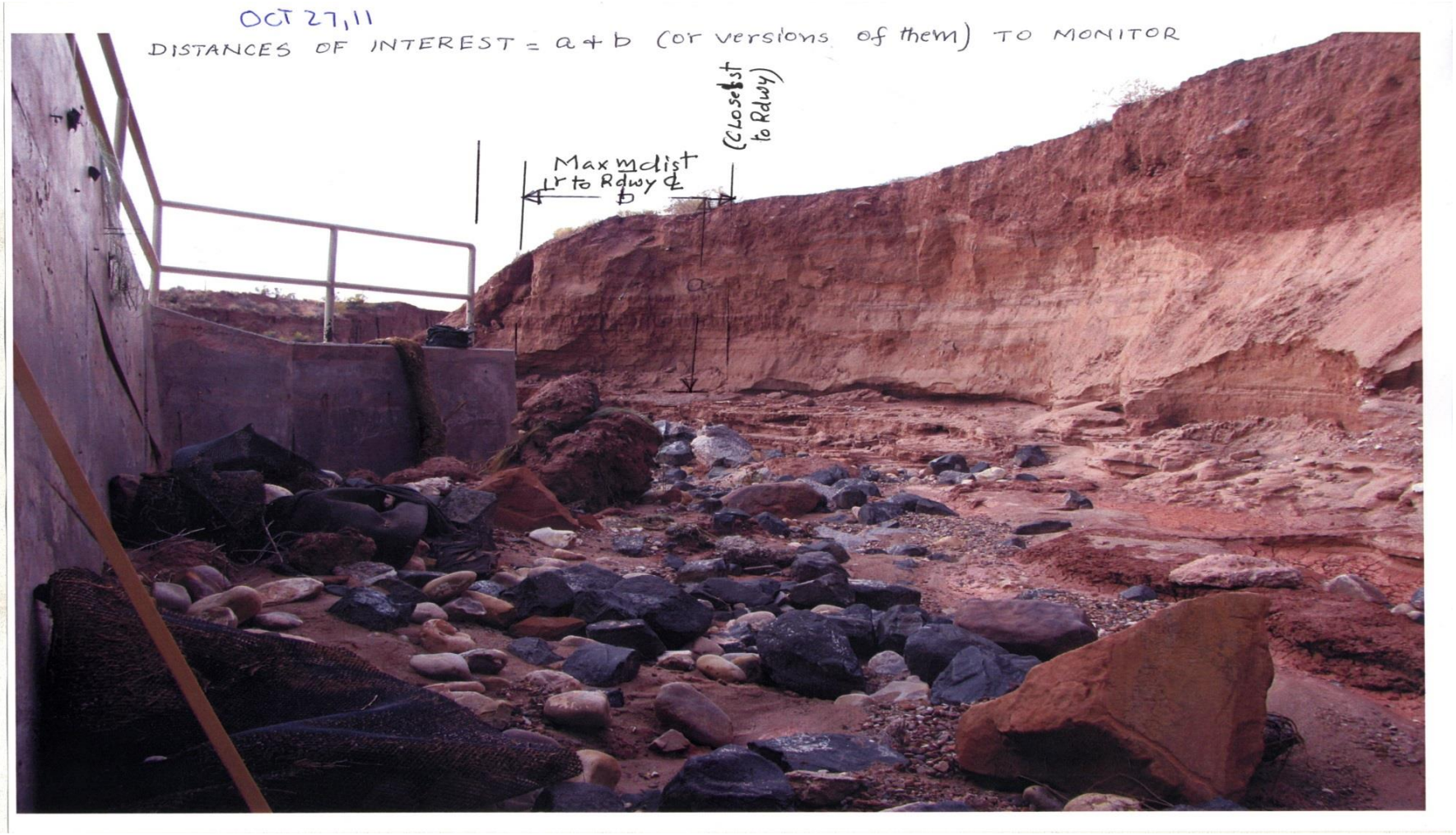
Impacts

Impacts

Impacts

Impacts

Impacts


Oct 27,11
DISTANCES OF INTEREST = a + b (or versions of them) TO MONITOR
Max mdist
Lr to Rdwy ℄
b
(Closest
to Rdwy)
a

Impacts

Impacts

Impacts

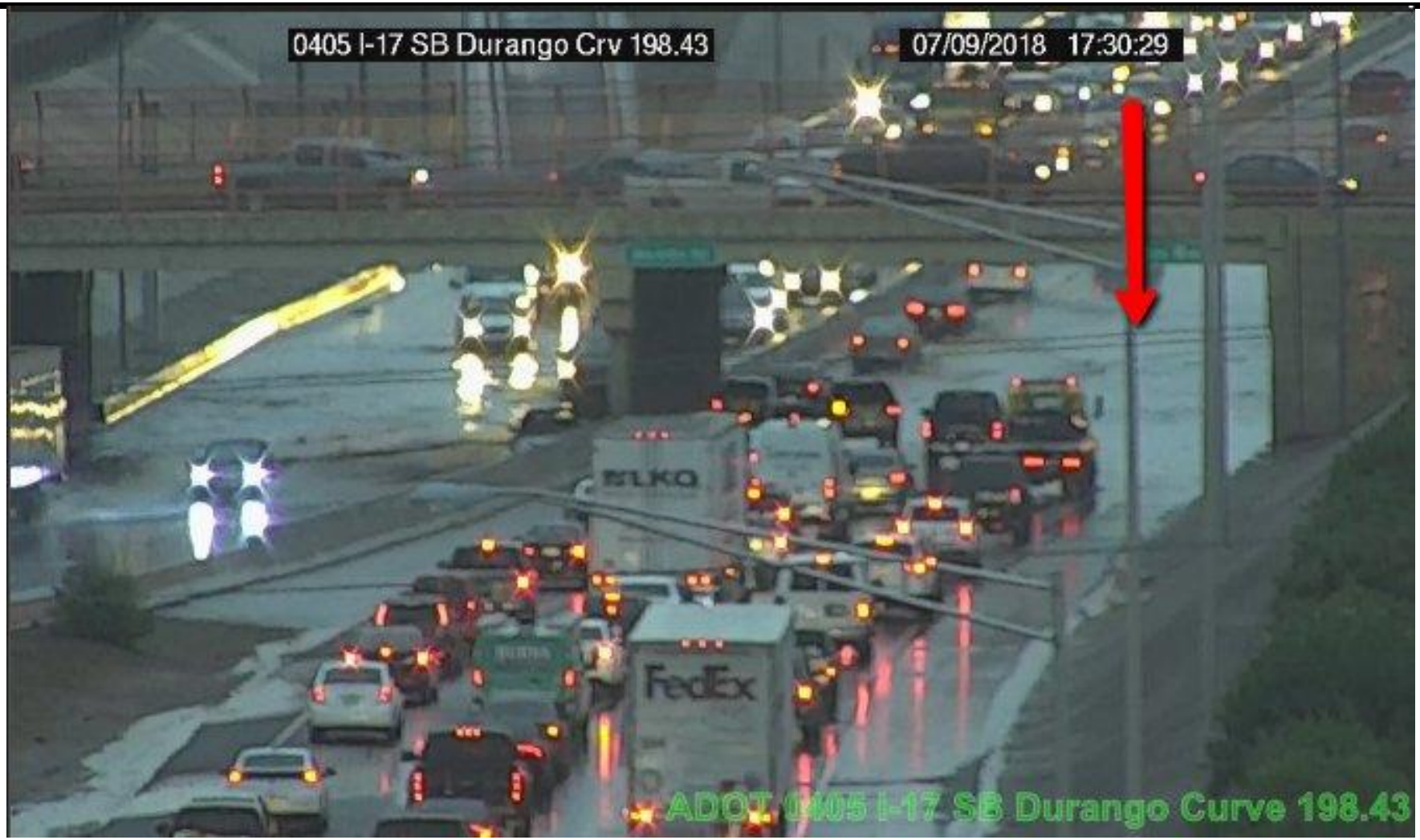

RAIN ON THE WAY?
AZ · CA · NV
MOISTURE BEING PULLED NORTH
T'STORM CHANCES INCREASE
HEAVY RAIN & FLASH FLOODING POSSIBLE
SEATTLE
BILLINGS
DENVER
LAS VEGAS
LOS ANGELES
PHOENIX
DALLAS
L
1
1
1
1
NORBERT

Impacts


EXITS 143 A-B
17
60
Flagstaff
2 MILES
EXIT 141
35th Ave
HOV 2+
ONLY

Impacts

Impacts


0405 I-17 SB Durango Crv 198.43
07/09/2018 17:30:29
FedEx
ADOT 0405 I-17 SB Durango Curve 198.43

Impacts

Impacts

Link to AM - Proposed Methodology

Root Cause Screening - TOC reports and/or known system risks/climate data

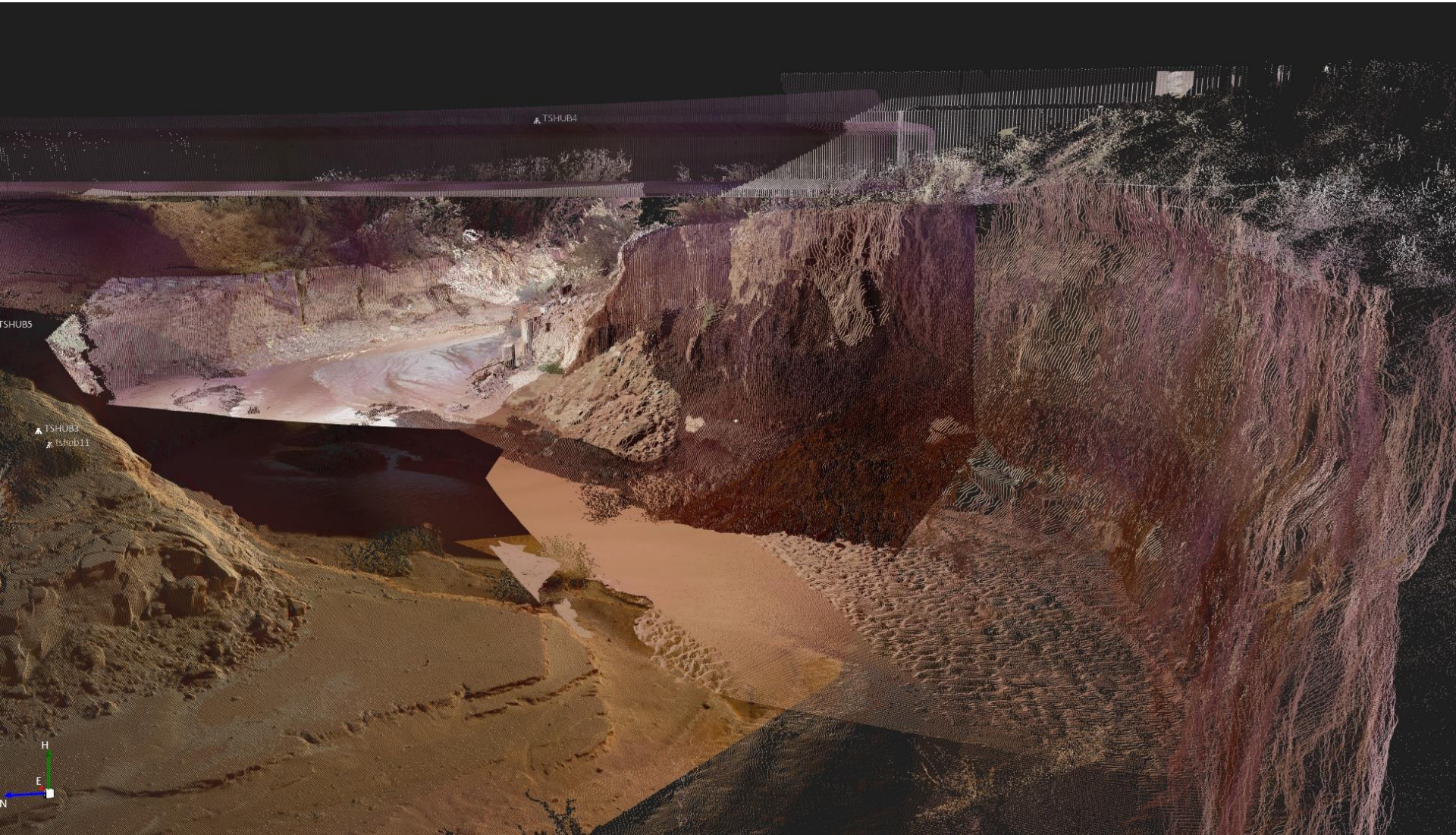
Direct - Design probabilistic modeling approach to produce an array of results
Optimize operation and maintenance of an increasingly aging stock, which is subjected to evolving loads (e.g. both live loading and climate induced loading). In response to this challenge the past decade has seen increased interest by infrastructure owners and managers in the use of probabilistic methods for the assessment/management of their assets. Employed once a deterministic assessment has rendered a repair/rehabilitate/replace now scenario.

Proxy Indicators – An indirect measure or sign that approximates or represents a phenomenon in the absence of a direct measure or sign.

Laguna Creek Bridge Bank Protection

Laguna Creek Bridge Bank Protection

Laguna Creek Bridge (Ground based LiDAR project)



Reach Monitoring in Dynamic Channels

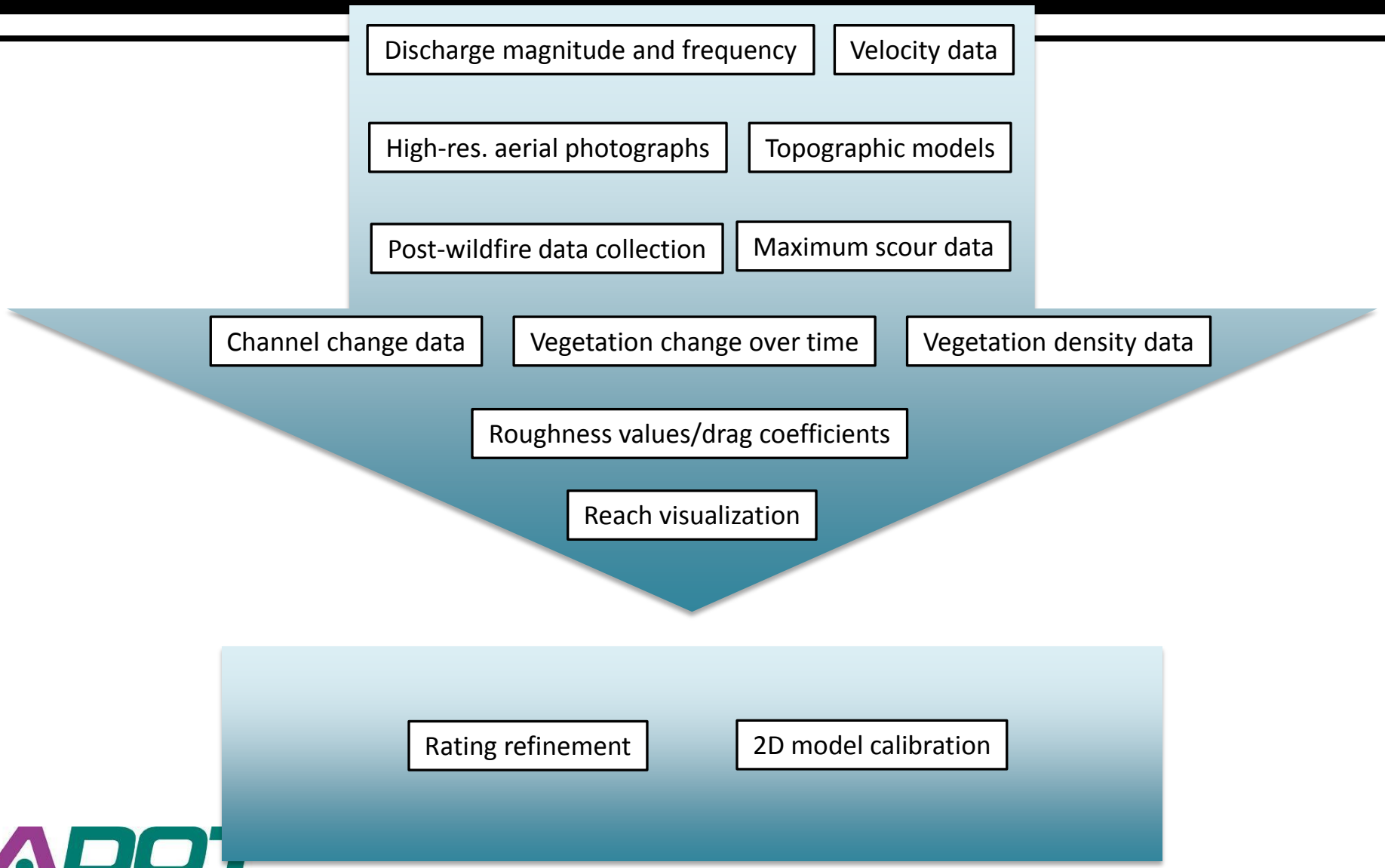
Understanding bank erosion and impacts to infrastructure

Laguna Creek Reach Monitoring:

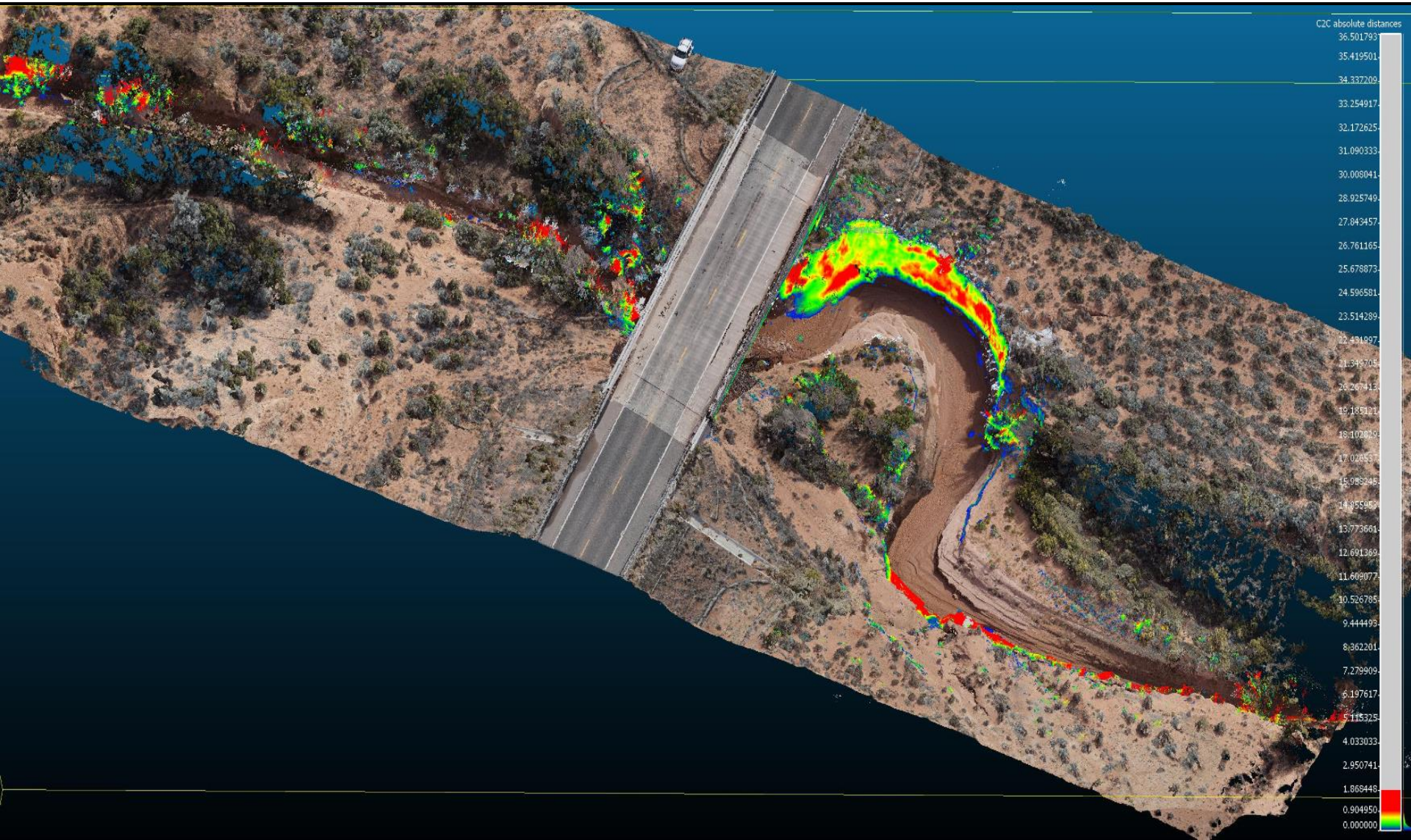
- Rapid deployment stream gage
- Surface velocity radar sensor
- Particle tracking video cameras
- Indirect discharge measurements
- Repeat LiDAR scans of bridge structure and surrounding channel
- sUAS (drone) survey

USGS

Reach Monitoring Products *Collecting data for the future*



3-D Erosion Change Detection Mapping



Laguna Creek Construction

ADOT

ADOT Resilience Project #2

November 2017 – State Route 160 Laguna Creek Bridge (Final grading and seeding)

Post Construction Monitoring

USGS Drone Data Capture – On-going Monitoring - Built Condition and Wash Meander / Ox-bow

North Carolina State

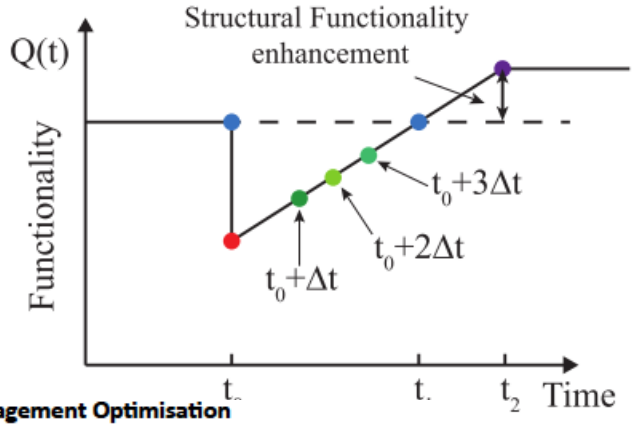
Shane Underwood – School of Civil, Construction, and Environmental Engineering
North Carolina State University – Climate Data Downscaling remainder of State(Pvmnt)

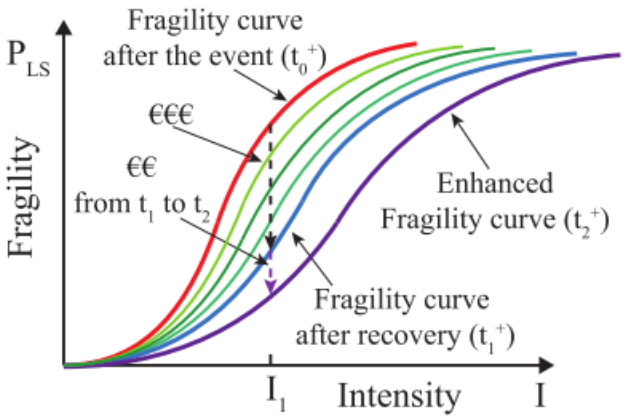
Modeling Center (or Group)	Institute ID	Model Name
Commonwealth Scientific and Industrial Research Organization (CSIRO) and Bureau of Meteorology (BOM), Australia	CSIRO-BOM	ACCESS1.0
Beijing Climate Center, China Meteorological Administration	BCC	BCC-CSM1.1
Canadian Centre for Climate Modeling and Analysis	CCCMA	CanESM2
National Center for Atmospheric Research	NCAR	CCSM4
Community Earth System Model Contributors	NSF-DOE-NCAR	CESM1(BGC)
Centre National de Recherches Météorologiques / Centre Européen de Recherche et Formation Avancée en Calcul Scientifique	CNRM-CERFACS	CNRM-CM5
Commonwealth Scientific and Industrial Research Organization in collaboration with Queensland Climate Change Centre of Excellence	CSIRO-QCCCE	CSIRO-Mk3.6.0
NOAA Geophysical Fluid Dynamics Laboratory	NOAA GFDL	GFDL-ESM2G GFDL-ESM2M
Institute for Numerical Mathematics	INM	INM-CM4
Institute Pierre-Simon Laplace	IPSL	IPSL-CM5A-LR IPSL-CM5A-MR
Japan Agency for Marine-Earth Science and Technology, Atmosphere and Ocean Research Institute, and National Institute for Environmental Studies	MIROC	MIROC-ESM MIROC-ESM-CHEM MIROC5
Max Planck Institute for Meteorology	MPI-M	MPI-ESM-LR

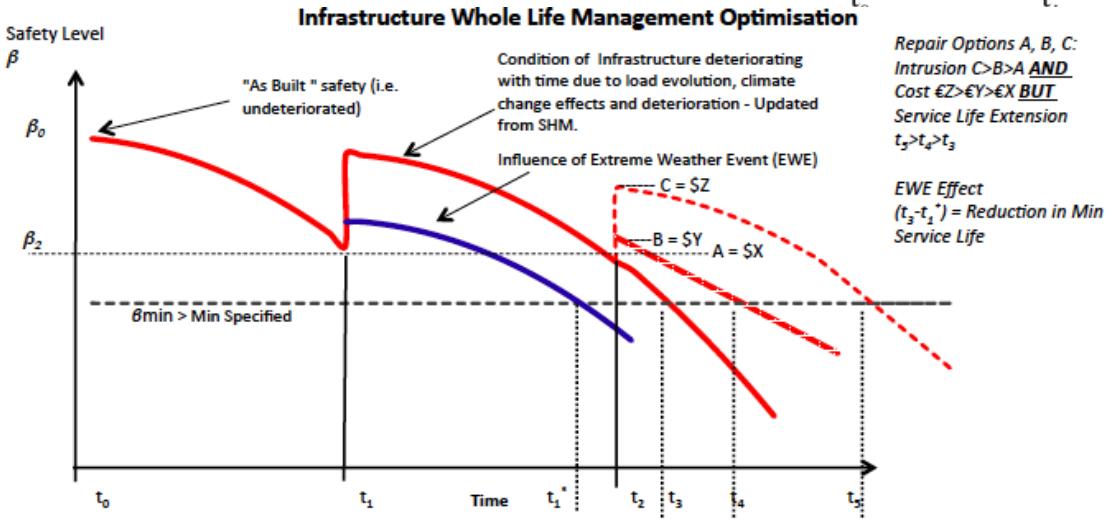
Trinity College Dublin

Alan O'Connor School of Engineering
Trinity College Dublin

Developing an asset class probabilistic engineering approach that assesses the stressors inherent to the built structure itself







Carnegie Mellon University

Constantine Samaras Department of Civil and Environmental Engineering
Carnegie Mellon University - Adjunct Senior Researcher, RAND Corporation

- Develop Economic Analysis Process
- Develop Life Cycle models to monitor investment
- Account for the differences in the deterioration model with new climate-informed asset management models

While different methods to quantify the economic impact of climate change for infrastructure can be found in the literature, none of these methods succeed in producing life cycle asset management plans that are robust to a wide variety of future climates. New methods for benefit cost analysis, return on investment studies, and major rehabilitation timeline analyses are needed that incorporate probabilistic approaches, and minimize regret by DOTs under a changing climate.

Questions?

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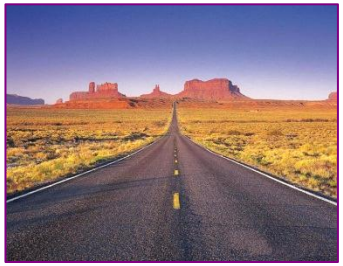


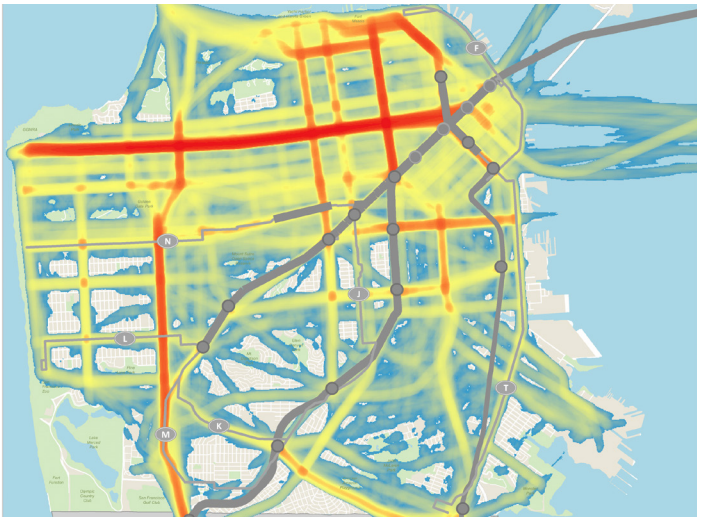

Virtual Public Involvement

Virtual public involvement supports agencies' efforts to engage the public more effectively by supplementing face-to-face information sharing with technology.

Innovative virtual public involvement techniques provide State departments of transportation (DOTs), transit agencies, metropolitan planning organizations (MPOs), and rural transportation planning organizations (RTPOs) with a platform to inform the public and receive feedback. These strategies create efficiencies in how information is disseminated and how input is collected and considered, which can potentially accelerate planning and project development processes.

ENCOURAGING PUBLIC ENGAGEMENT

Public involvement is a critical component in the transportation decision-making process, allowing for meaningful consideration and input from interested individuals. As daily users of the transportation system, the public has useful opinions, insights, and observations to share with their State DOT, MPOs, and local agencies on the performance and needs of the transportation system or on specific projects. Timely and strong public engagement has the potential to accelerate project delivery by helping identify and address public concerns early in the planning process, thereby reducing delays from previously unknown interests late in the project delivery process.



A heat map illustrates responses from citizens when they were asked where future subways should be built.
Source: San Francisco Municipal Transportation Authority

Virtual public involvement tools include online surveys, visualization, and telephone town halls.

Nearly all State DOTs and most MPOs and local agencies use websites to post information about their activities. With the increased use of social media tools and mobile applications, the public can access user-friendly features such as online videos, podcasts, crowdsourced maps, and other interactive forums to receive information and provide input.

These new opportunities for information sharing and public involvement in the transportation planning, programming, and project development process include, but are not limited to, telephone town halls, online meetings, pop-up outreach, social meetings/ meeting-in-a box kits, story maps, quick videos, crowdsourcing, survey tools, real-time polling tools, social media following, visualization, and working with bloggers.

BENEFITS

- **Efficiency and Low Cost.** Virtual tools and platforms can efficiently be made accessible to communities, many at a lower cost than traditional public engagement methods.
- **Accelerated Project Delivery.** Robust public engagement helps identify issues early in the project planning process, which reduces the need to revisit decisions.

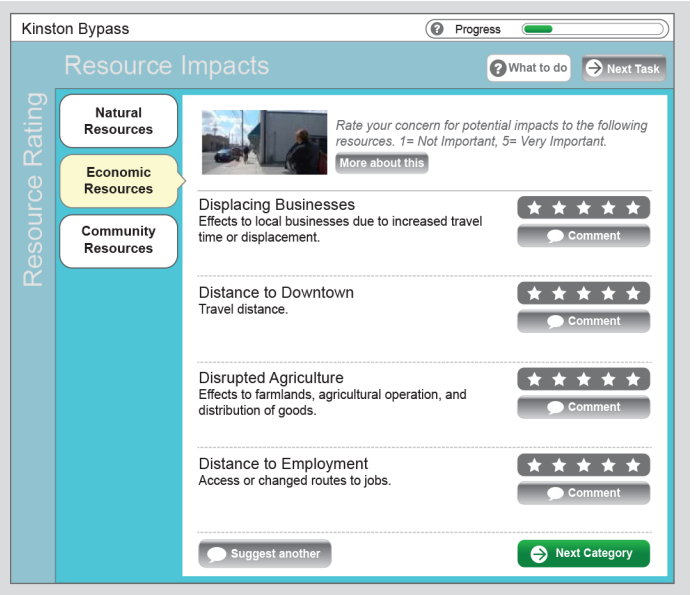
Virtual Public Involvement

- **Communication and Collaboration.** Virtual public involvement can aid in establishing a common vision for transportation and ensure the opinions and needs of the public are understood and considered during transportation planning and project development.
- **Expanded Engagement.** Virtual tools include stakeholders who do not participate in traditional approaches to public involvement. Greater engagement can improve project quality.

STATE OF THE PRACTICE

Virtual public involvement provides State DOTs, MPOs, and local agencies throughout the country with a platform of innovative tools and strategies for making public involvement more accessible, thus providing a better understanding of the public's concerns regarding transportation system performance and needs. The following are examples of successful virtual public involvement techniques:

- Colorado DOT held telephone town halls to conduct large-scale outreach while developing a long-range statewide transportation plan, including one town hall for each MPO and RTPO region in the State.
- Minnesota DOT targeted limited English proficiency (LEP) populations while updating the Statewide Multi-modal Transportation Plan by using tablet-based surveys in multiple languages. The tablet-based surveys allowed Minnesota DOT staff to visit LEP communities and solicit stakeholders to easily point, click, and respond.
- The City of Richmond, VA, used targeted stakeholder meetings, a "wikimap," and innovative data collection via a cloud-based data-gathering tool to gather field observations and specific information from people with first-hand experience biking and walking along Richmond's streets.



The North Carolina DOT used public involvement software to guide the development of its 2018-2027 State Transportation Improvement Program (STIP).

- Delaware DOT created a mobile app that assembles project information, provides real-time traffic alerts, notifies users of project-related upcoming public meetings, and provides a way for stakeholders to contact DelDOT when issues arise.
- North Jersey Transportation Planning Authority is using real-time polling as part of live meetings and webinars.
- Texas' Alamo Area MPO is using low-cost videos in posts on social media.
- Florida DOT holds virtual public hearings for median alterations. These online meetings have improved participation, reduced costs, and elicited useful project feedback.

RESOURCES

FHWA EDC-5 Virtual Public Involvement
https://www.fhwa.dot.gov/innovation/everydaycounts/edc_5/virtual_public_involvement.cfm

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