

A stylized graphic of a road with a dashed orange center line and a solid dark grey outer boundary. The road curves across the top and right side of the page. Several green triangles are scattered around the road, some above and some below it. The background is white, and there is a blue and green horizontal bar at the bottom.

# **ROAD INVENTORY SUBMISSION APPLICATION**

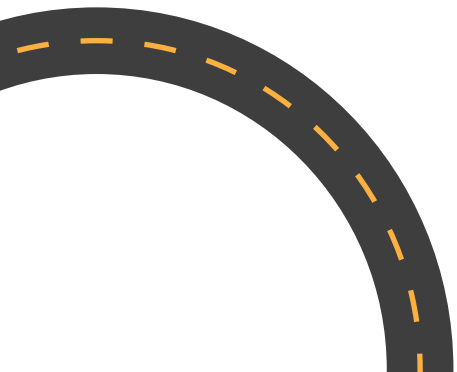
# MASSDOT GIS

## A B O U T

- Office of Transportation Planning
- Managed by Kevin Lopes
- Team of ~10 analysts, developers, & coordinators
- Produces GIS data to acquire federal funding through HPMS

## M O D E R N I Z A T I O N

- ▶ GIS has experienced phenomenal & unanticipated change in the past five years
- ▶ MassDOT has used this change to the way we use transportation data in Massachusetts
- ▶ Moving from a siloed, desktop editing environment to an online, server-based environment has allowed us to create



# GOALS

Maintain the accuracy of the Road Inventory and other datasets.

Provide a centralized platform for Mass-DOT's geospatial activity on the web.

Enable partner access to consistent and equitable tools.

Increase public participation in transportation activities through technological advancements.

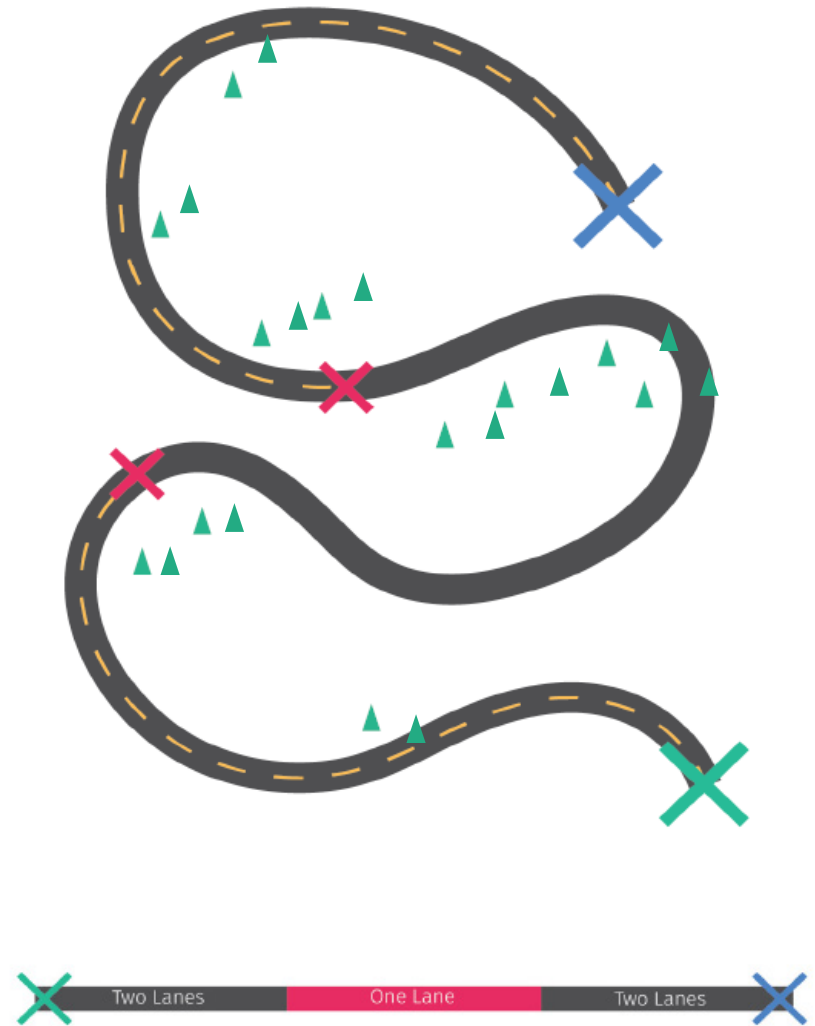
# ROAD INVENTORY FILE

## DETAILS

Maintained as a function of HPMS, the RIF is finalized and published once annually as a summary of the year before.

Exists as a linear referencing system (LRS): a geometry network that relies on a series of relational tables.

Updates are happening continuously throughout the year with many of the +100 data attributes that exist changing frequently.



# LIMITATIONS

## DATA SILOS

- ▶ Local data owners have a better understanding of road conditions.
- ▶ Many local and regional governments maintain their own transportation datasets independent of the RIF.
- ▶ Groups within MassDOT use data differently, maintain only state roads, at different time periods, to a varied degree of specificity.

## TECHNOLOGY

- ▶ Multiple user groups editing the same data at the same time
  - ▶ Data needs and understanding
- Moving from a siloed, desktop editing environment to an online, server-based
- ▶ environment has allowed us to create

# UPDATE PROCESS

2005 - 2017

Redundant work flows

Lack of tracking, no accountability

Outreach efforts are largely ignored >:(

Reliant on physical mail



2018 - FORWARD

Digital interface

Robust annual reporting tools

Ability to make frequent edits

Customizable tools

Automated notifications

COMMONWEALTH OF MASSACHUSETTS  
EXECUTIVE OFFICE OF TRANSPORTATION  
OFFICE OF TRANSPORTATION PLANNING

8/13/18

NEW ROAD ENTRY FORM FOR ROAD INVENTORY FILE

1. CITY/TOWN BROCKTON

2. STREET NAME: Gary Road (include suffix)

3. FROM LOCATION: Boundary Avenue [street, oil-to-sid dead-end, town/zone line, private property]

TO LOCATION: Brookville Avenue (east)

# CHAPTER 90



- ▶ A funding mechanism tied to the road inventory product.
- ▶ Encourages municipalities to participate in data maintenance activities as updates may lead to an increase in funding.

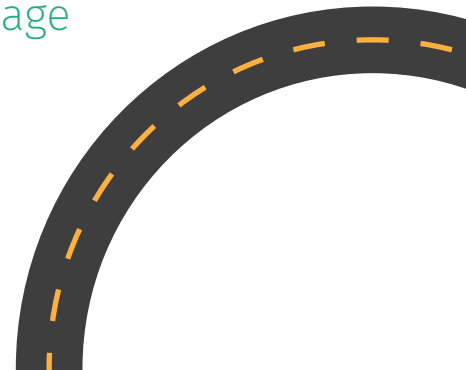
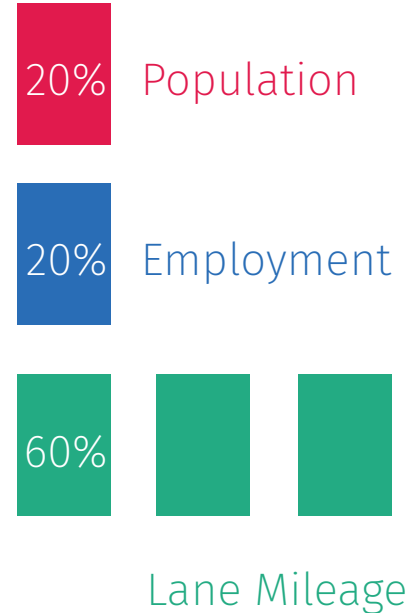
## R U L E S

If a road isn't in our database, it will not be in the final mileage total.

If a town is maintaining a road, it should be owned by the town.

Our database should be confirmed by each town semi-annually.

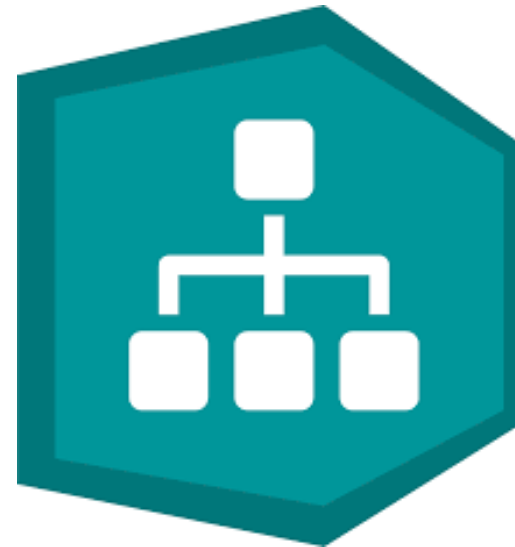
## F O R M U L A



# DEVELOPMENT




CARL HUGHES

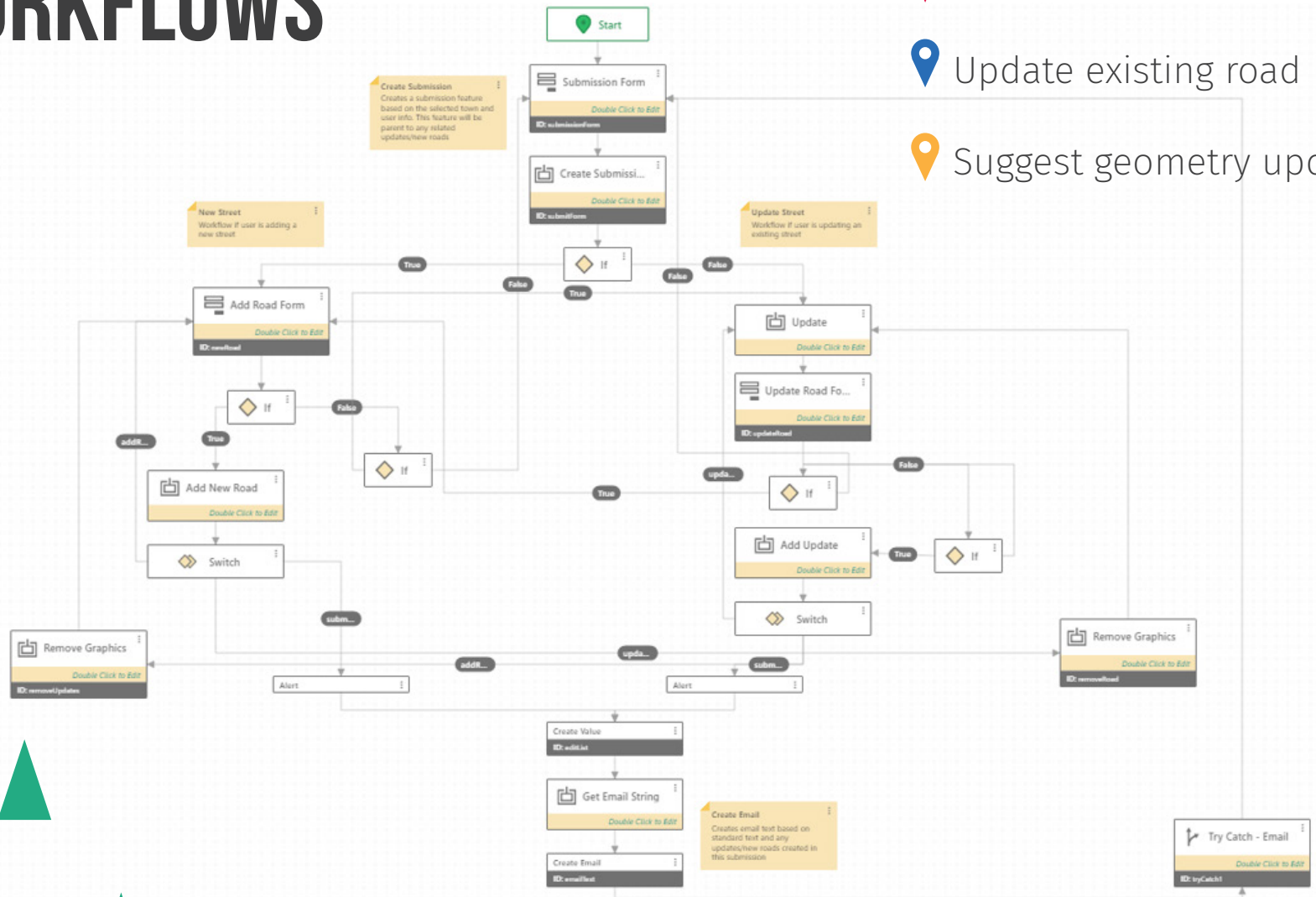
- Developed in an Esri Enterprise environment, and included as part of our ArcGIS Online organizational account, geoDOT.
- Leverages Geocortex by Latitude Geographic, a tool for streamlined GIS development that relies on building business processes as *workflows*.
- Geocortex communicates directly with AGOL web application builder, MassDOT's LRS environment and Roads & Highways infrastructure.





# WORKFLOWS

-  Add new road
-  Update existing road
-  Suggest geometry update



# CONCEPTS

- ▶ Consists of several forms completed by the user.
- ▶ Form are used to create submission features with related child records for each road update or new road being submitted.
- ▶ Features are stored in intermediary feature class before LRS edits are applied and they show up in the RIF.
  - For new roads, a new LRS route is created in ArcMap before attributes can be applied.
  - Route ID is generated within the workflow.
  - User only needs to copy the geometry into the LRS feature class.
- ▶ Utilizes *LRSServer* functionality, such as *geometryToMeasure* and *measureToGeometry*, and *queryAttributeSet*.



# BETA TESTING

Group of 25 local and regional government users.

Provided critical insights to how we should restructure our user experience.

## ROAD INVENTORY UPDATE TOOL USER EXPERIENCE WORKSHEET

Date: / /

### TESTER INFORMATION

Name: \_\_\_\_\_

Agency/Department: \_\_\_\_\_

Email: \_\_\_\_\_

### USER QUESTIONS

Notes & Comments:

- How do you envision using this tool?  
 Jurisdiction Updates       Other: \_\_\_\_\_  
 Other Attribute Updates      \_\_\_\_\_  
 Geometry Realignments      \_\_\_\_\_
- Do you think the splash screen should be changed?  
 Too wordy       Other: \_\_\_\_\_  
 Too confusing       \_\_\_\_\_  
 Add pictures       \_\_\_\_\_
- Do you find the default basemap to be useful?  
 Yes  
 No: \_\_\_\_\_
- Did you have any trouble navigating?  
 No  
 Yes: \_\_\_\_\_
- Did you find any of the tools to be difficult to use?  
 No  
 Yes: \_\_\_\_\_
- Were you confused at any point during the update process?  
 No  
 Yes: \_\_\_\_\_

7 Comments about the *Add New Road* Workflow:  
\_\_\_\_\_  
\_\_\_\_\_

8 Comments about the *Updating Existing Road* Workflow:  
\_\_\_\_\_  
\_\_\_\_\_

Notes & Comments:

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# UPDATE EXISTING

[Road Inventory Data Dictionary](#)

Cancel and Add New Road

Select the road to update by choosing a road name from the drop down menu or by using the road picker to click a road on the map

Road Name

BAKER ROAD

Road Picker

+ Click a road on the map

LRS Route ID

L200666 EB

Attach Documentation

+ Add File

+ Add From/To Points

From Mile

0.000

To Mile

0.737

Length

in miles

0.737

Attribute(s) to Update

Hold Ctrl/Shift to select multiple items

Street Name

Jurisdiction

Left Side Shoulder - Type

Left Side Shoulder - Width

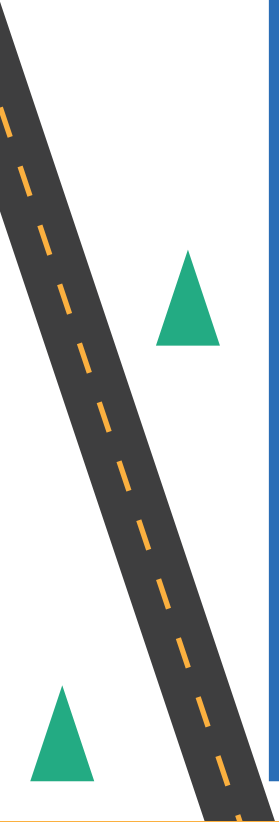
Surface Width

Surface Type

Right Side Shoulder - Type

Update Attributes

Comments or Notes



# ADD NEW ROAD

**massDOT** Road Inventory Submission Application  
Massachusetts Department of Transportation

Cancel and Update Road

Road Name  
BOWENS Pond Road

Attach Documentation  
+ Add File

Road Geometry [X]  
+ Draw Road Shape

From Location  
Wendell Depot Road

To Location  
Dead End

Length  
in miles  
0.413

Jurisdiction  
Private

Left Side Shoulder

Find address or place

BOWENS Pond

Pictometry  
05/20/2017 1 of 7 Select Date

Legend

Updates and New Roads

- ROAD UPDATE
- NEW ROAD

Submissions

Road Inventory

- Massachusetts Department of Transportation
- City or Town accepted road
- Unaccepted by city or town
- Department of Conservation and Recreation
- State Park or Forest
- Private
- US Air Force
- State Institutional
- Massachusetts Port Authority
- State college or university
- Other

# INTERNAL PROCESSING



The screenshot displays an ArcGIS web application interface. On the left, there is a legend and a road inventory list. The main map area shows an aerial view of a residential neighborhood with several roads highlighted in blue and green. A green line on the map is labeled 'NEW ROAD - 11/17/2018'. Below the map is a data table titled 'DEV\_RH.DBO.RoadUpdateEdits (Features: 5, Selected: 1)'. The table has columns for Contact, Street Name, From Street Name, To Street Name, Length, Submission ID, Status, Comments, Left Condition, and Right Condition. The row for 'Quinn Molloy' is selected and highlighted in blue.

**Legend**

**Updates and New Roads**

- ROAD UPDATE
- NEW ROAD

**Submissions**

**Road Inventory**

- Massachusetts Department of Transportation
- City or Town accepted road
- Unaccepted by city or town
- Department of Conservation and Recreation
- State Park or Forest
- Private
- US Air Force
- State Institutional
- Massachusetts Port Authority
- State college or university
- Other

**Submissions**

Contact	Street Name	From Street Name	To Street Name	Length	Submission ID	Status	Comments	Left Condition	Right Condition
Quinn Molloy (1)									
Quinn Molloy (1)									
<b>Quinn Molloy (5)</b>	Lavole Lane	Essex Street	Cul-de-sac	0.131	MolloyQ_Pla-184-2018-8-21 14:39:9	Submitted	From location: Essex Street To location: Cul-de-sac Notes:	Good	
Jose (0)									
Carlin Andrus (1)									



# NEXT STEPS

## LOOKING FORWARD

- ▶ Host workshop for municipal and local users at the MassDOT Moving Together Conference on 11/1.
- ▶ Host a webinar for potential users or other interested states by the end of the year.
- ▶ Improve functionality and widen scope to include state employee projects.
- ▶ Integrate with MA Highway Project Intake Tool.



## WEBSITES

RISA  
[gisdev.massdot.state.ma.us/risa](https://gisdev.massdot.state.ma.us/risa)

GeoDOT  
[massdot.maps.arcgis.com](https://massdot.maps.arcgis.com)

Open Data site  
[geo.massdot.opendata.arcgis.com](https://geo.massdot.opendata.arcgis.com)

MassDOT  
[mass.gov/massdot](https://mass.gov/massdot)

More Information  
[www.mass.gov/service-details/submit-road-inventory-updates](https://www.mass.gov/service-details/submit-road-inventory-updates)

## CONTACTS

Quinn Molloy  
GIS Municipal Coordinator  
[Quinn.Molloy@state.ma.us](mailto:Quinn.Molloy@state.ma.us)  
857-368-8841

Kevin Lopes  
GIS Services Manager  
[Kevin.Lopes@state.ma.us](mailto:Kevin.Lopes@state.ma.us)  
857-368-4447

Thanks for your attention!!