

ROAD SAFETY ASSESSMENTS

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Making Your Roads Safer

Outline

- Safety stats
- Define RSA
- Give Examples
- Process – eval data > problem ID > countermeasures
- Tools > Roadside Design > MUTCD > HSM
- Resources > RSA P2P & SMS Committee > upcoming TTP Safety Program



Road Safety Audit

A formal and independent safety performance review of a **road project** by an independent, multidisciplinary, experienced team of safety professionals, addressing the safety of all road users.











Transportation Safety Plan

A data-driven plan developed by a multi-disciplinary team to improve safety on the **entire road network** by prioritizing the activities implemented by a government and communicating these priorities with safety partners.

Transportation Safety Plans



	Lane Departure
	Night / Low Light Crashes
	Young Drivers (<20 years old)
	Speed Management
	Restraint Usage
	Impaired Driving
	Special Users: Pedestrians and Bicycles (17% of reservation fatal crashes compared to 9% statewide)
	Intersection related crashes

Data Management

 = 10 deaths in 5 years



Emphasis Area:

Roadway Departure in Curves

Why strategic?

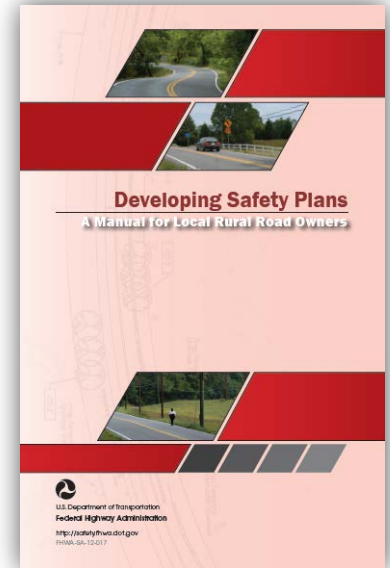
Although curves are only 15% of road miles, they contribute to 46% of all fatal crashes.

Strategies / Countermeasures:

- Improved signage
- Improved friction
- Location markers for emergency location

Transportation Safety Plans

FHWA Developing Safety Plans Guidebook



Recorded Webinar
[http://flh.fhwa.dot.gov/
programs/ttp/safety/](http://flh.fhwa.dot.gov/programs/ttp/safety/)



Road Safety Audit



Definition

Road Safety Audit

A formal and independent safety performance review of a road transportation project by an experienced team of safety professionals, addressing the safety of all road users.

Key Points

- Formal: Procedures & Documentation
- Independent: Auditors Detached from Road Agency & Design Team, No Bias
- Safety Performance: Focus on Substantive Safety
- Experienced Team: Audit work is based on experience and knowledge
- All Road Users: All relevant human travel modes are considered



Risk Assessment Scale

RISK CATEGORY		SEVERITY			
		Low	Medium	High	Severe
Crash Frequency	Frequent	C	D	E	F
	Occasional	B	C	D	E
	Infrequent	A	B	C	D
	Rare	A	A	B	C

Risk Levels

A	Minimal	D	Significant
B	Low	E	High
C	Moderate	F	Extreme



An RSA is **NOT**....

... a simple standards check for adherence to design guidelines.

BUT...

An RSA is a process that looks beyond normal design guidelines to improve the substantive safety performance.

Nominal vs. Substantive Safety

Nominal Safety



Nominal safety is meeting the standards

Substantive Safety



Substantive safety is doing what works for the site.

Nominal vs. Substantive Safety



Table 2C-5. Horizontal Alignment Sign Selection

Type of Horizontal Alignment Sign	Difference Between Speed Limit and Advisory Speed				
	5 mph	10 mph	15 mph	20 mph	25 mph or more
Turn (W1-1), Curve (W1-2), Reverse Turn (W1-3), Reverse Curve (W1-4), Winding Road (W1-5), and Combination Horizontal Alignment/Intersection (W10-1) (see Section 2C.07 to determine which sign to use)	Recommended	Required	Required	Required	Required
Advisory Speed Plaque (W13-1P)	Recommended	Required	Required	Required	Required
Chevrons (W1-8) and/or One Direction Large Arrow (W1-6)	Optional	Recommended	Required	Required	Required
Exit Speed (W13-2) and Ramp Speed (W13-3) on exit ramp	Optional	Optional	Recommended	Required	Required





Costs and Benefits

The following are typical values...

- **Audit Costs:** \$5k to \$30k per audit stage
- **Design Costs:** vary (change drawings)
- **Construction Costs:** vary (to build accepted audit suggestions)
- **Benefits:** Lives saved, crashes prevented, or severity decrease
- **Benefit / Cost ratio:** 10:1 or better
- **Crash reductions up to 60%**



When should an RSA be done?

- RSAs can be done at any stage in a project's life:
 - *A pre-construction RSA (planning and design stages) examines a road before it is built, at the planning/feasibility stage or the design (preliminary or detailed design) stage. An RSA at this stage identifies potential safety issues before crashes occur. The earlier a preconstruction RSA is conducted, the more potential it has to efficiently remedy possible safety concerns.*
 - *Construction RSAs (work zone, changes in design during construction, and preopening) examine temporary traffic management plans associated with construction or other roadwork, and changes in design during construction. RSAs at this stage can also be conducted when construction is completed but before the roadway is opened to traffic.*
 - *A post-construction or operational RSA (existing road) examines a road that is operating, and is usually conducted to address a demonstrated crash problem.*

Why Do We Need Audits?

Planning / Design / Operations /
Maintenance involve Complexity,
Constraints, and Trade-Offs:

- Cost
- Right of Way
- Environment
- Geotech Conditions
- Socio Economics
- Capacity / Efficiency
- Politics





Road Safety Audits (RSA)

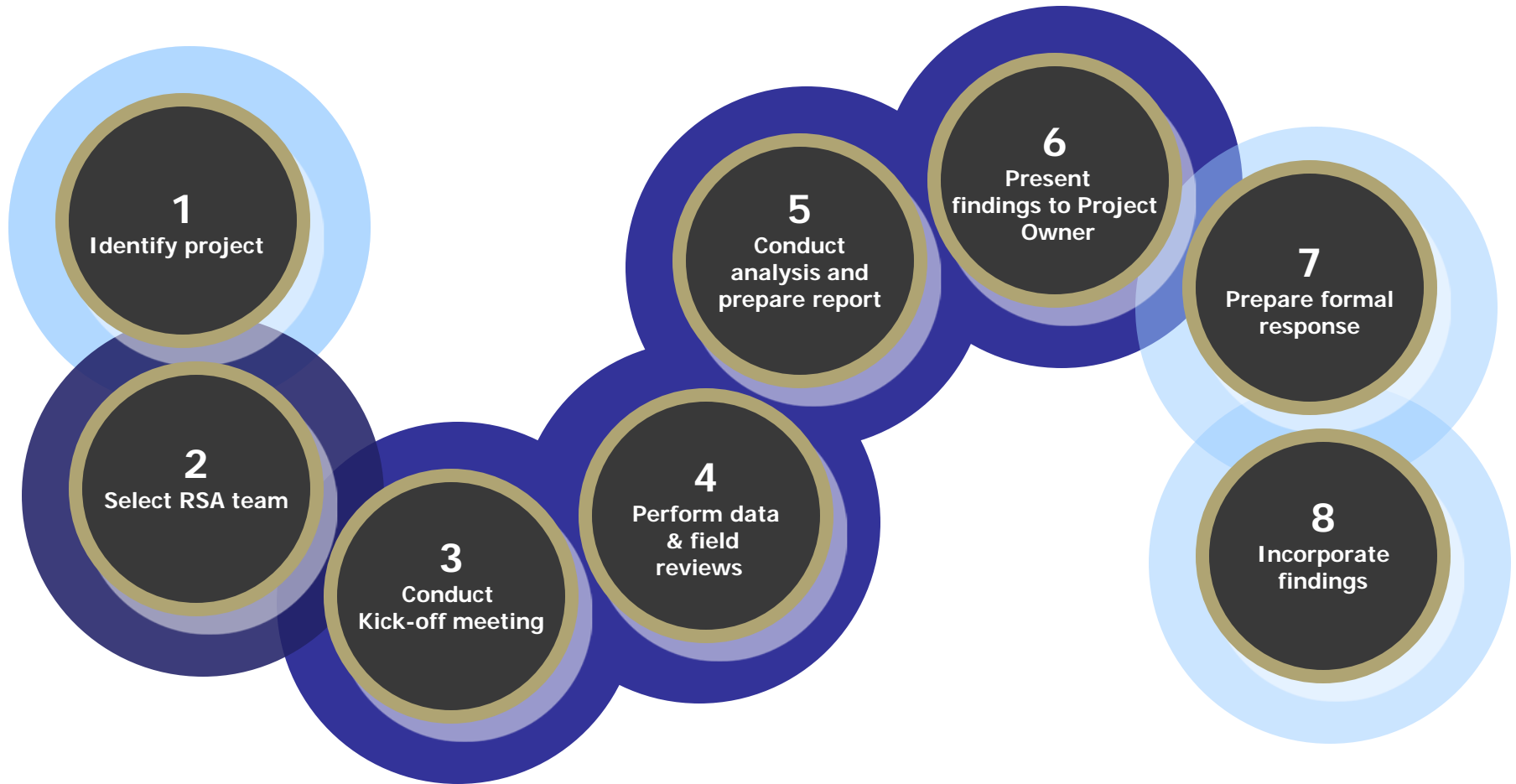
How?

Responsibilities



RSA Team

Design Team / Project Owner

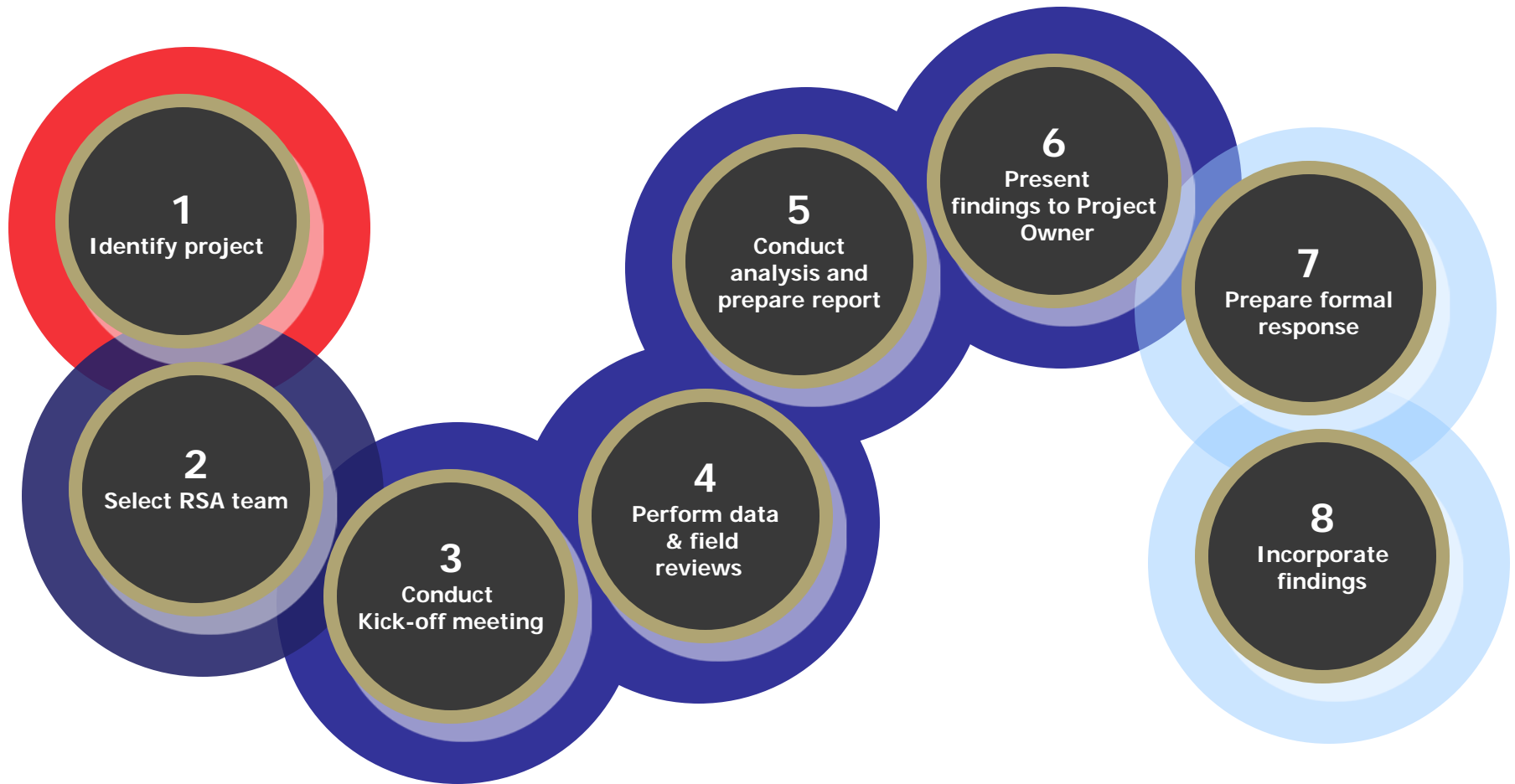


Responsibilities



RSA Team

Design Team / Project Owner



Owner's Permission



US Department
of Transportation
**Federal Highway
Administration**

Western Federal Lands Highway Division
610 E. Fifth Street
Vancouver, WA 98661
Phone 360-619-7700
Fax 360-619-7846

10 June 2011

Mr. Steve Titus, P.E.
Regional Director - Northern Region
Alaska Department of Transportation & Public Facilities
2301 Peger Rd.
Fairbanks, AK 99709

Dear Mr. Titus,

The Federal Highway Administration is requesting permission from the State of Alaska Department of Transportation to conduct a Road Safety Assessment (RSA) on the Elliott Highway from the Dalton Highway Junction to Manley Hot Springs. The goal of this assessment would be to identify risk factors that have or may contribute to fatal and incapacitating injury crashes on this roadway and strategies to address these risks. A range of strategies will be provided but the recommendations will focus on low cost safety improvements. The Manley Village Council requested the proposed RSA because of concerns in their community concerning the safety performance of this roadway.

Travel expenses for the RSA Team would be funded by the Manley Village Council. In addition, the council has indicated that they may be willing to participate financially in any infrastructure improvements that are identified by the study. However, the RSA team recommendations will not be biased by the funding source and the team members will be independent from the council.

The RSA process has been used around the United States, including in Alaska, and has been proven a valuable tool for improving roadway safety. An RSA examines historical information, existing site conditions, and crash data to determine the risk factors that have or may contribute to poor safety performance. The risk factors are then addressed in a report from the team with recommendations of reasonable safety improvements. The RSA team will be a multi-disciplinary group of highway safety professionals who are not intimately familiar with the site.

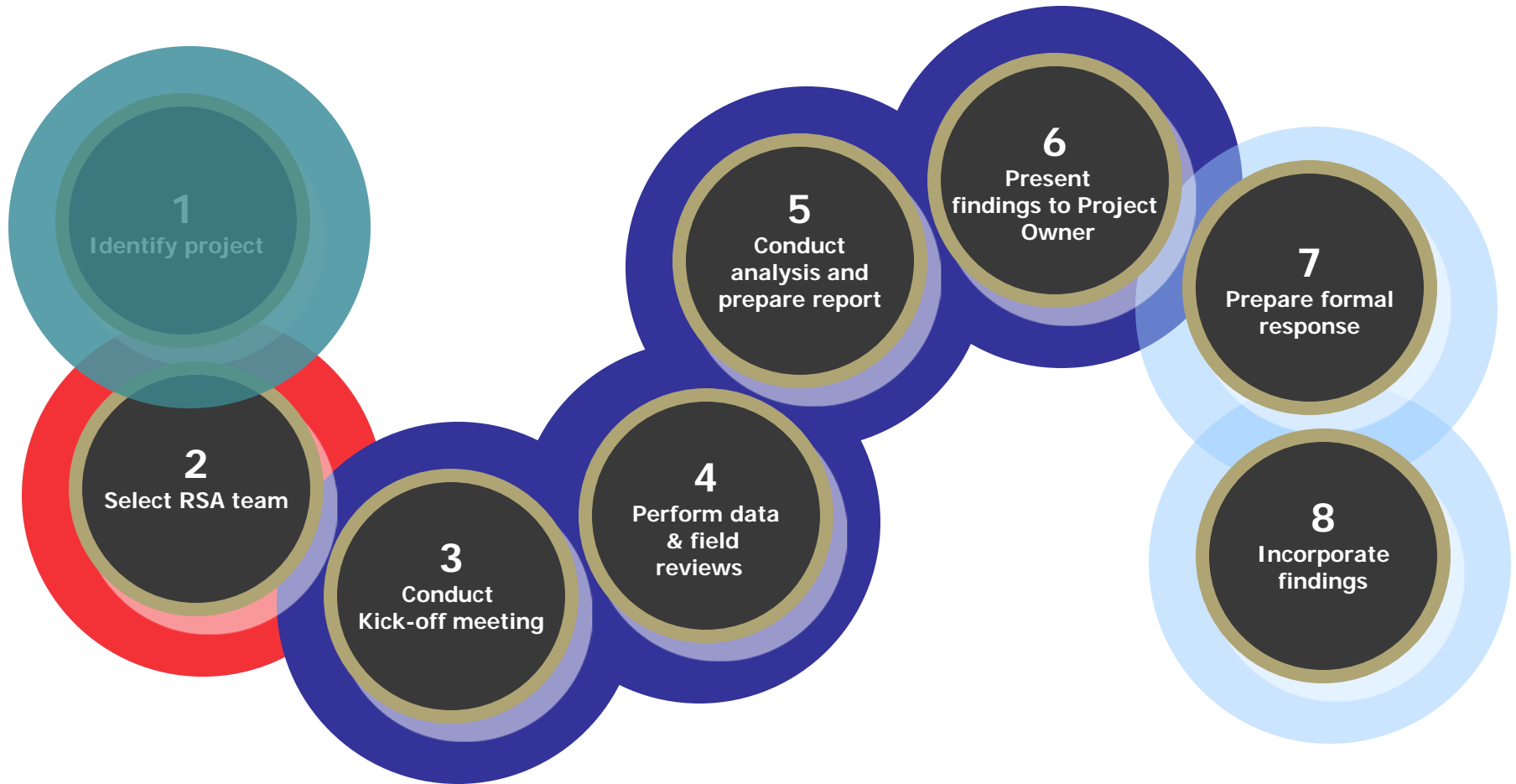


Responsibilities



RSA Team

Design Team / Project Owner



Road Safety Audit Team

- Independent
- Typically Safety Specialists
- Typically Multi-disciplinary



Road Safety Audit

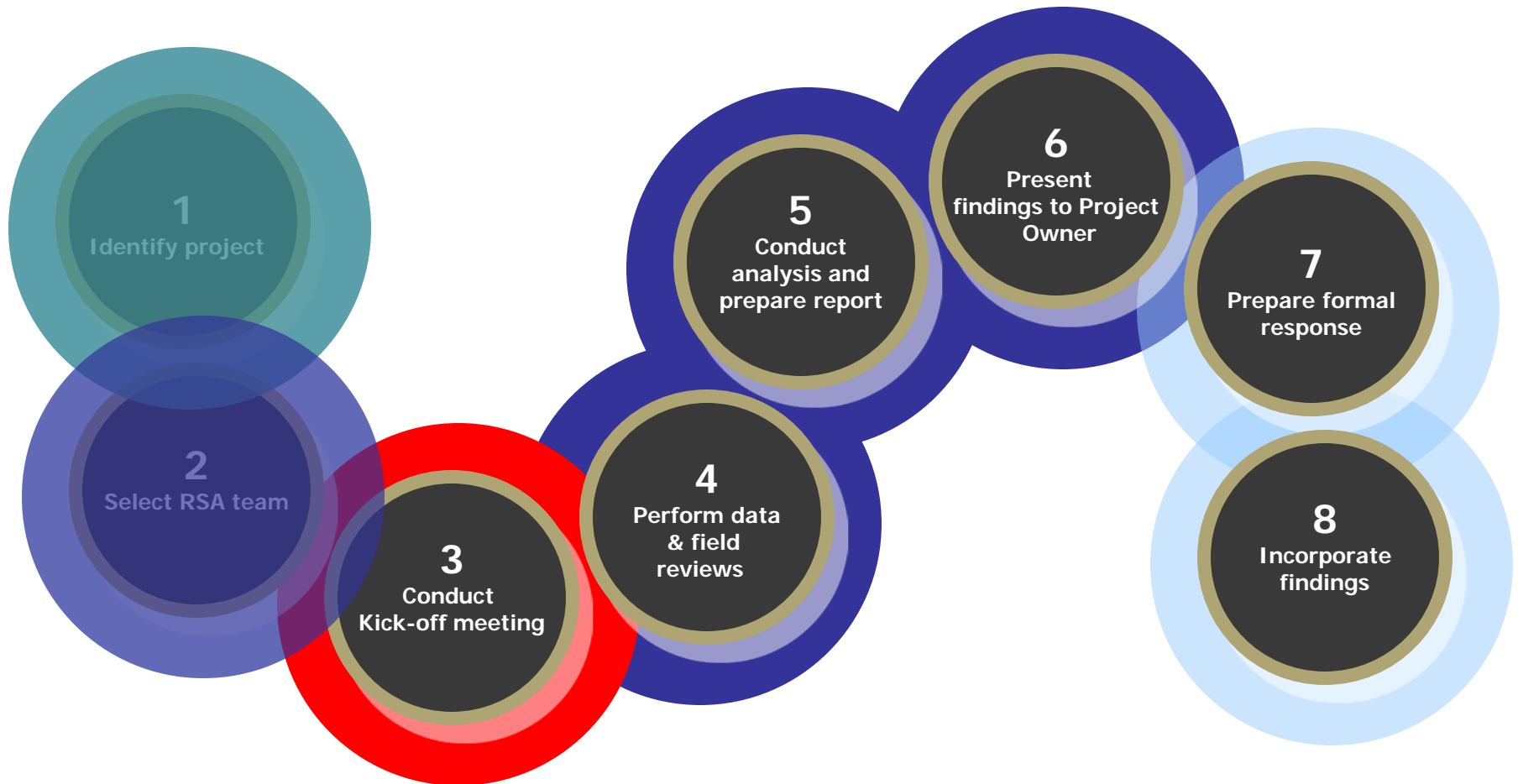


Responsibilities



RSA Team

Design Team / Project Owner



RSA Kick-off Meeting

Objectives

- Input from owner/operator
- Questions from team on Road's History
- Inform everyone of RSA process
- Coordinate available resources

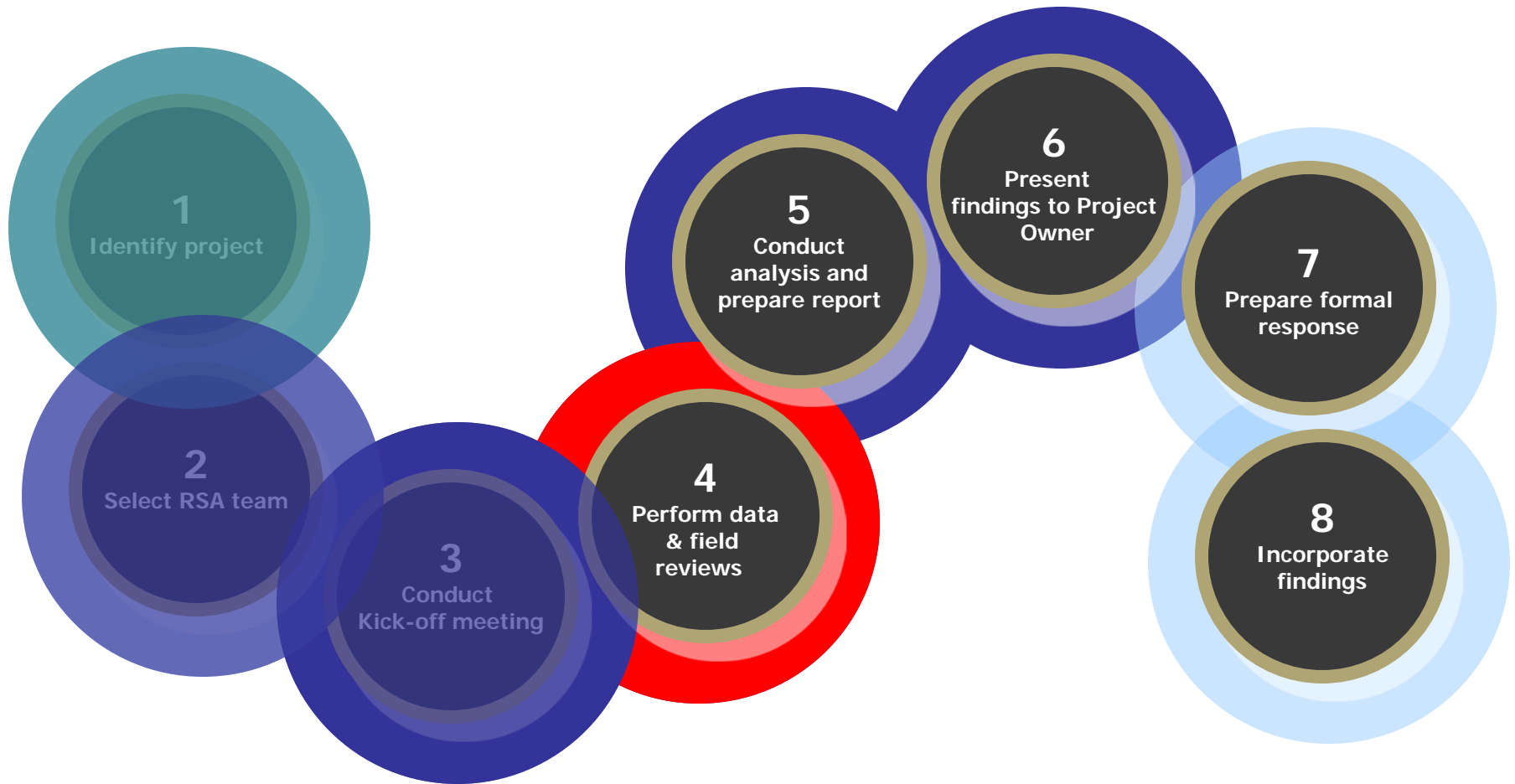


Responsibilities



RSA Team

Design Team / Project Owner





What problems exist?



Do Not
Assume

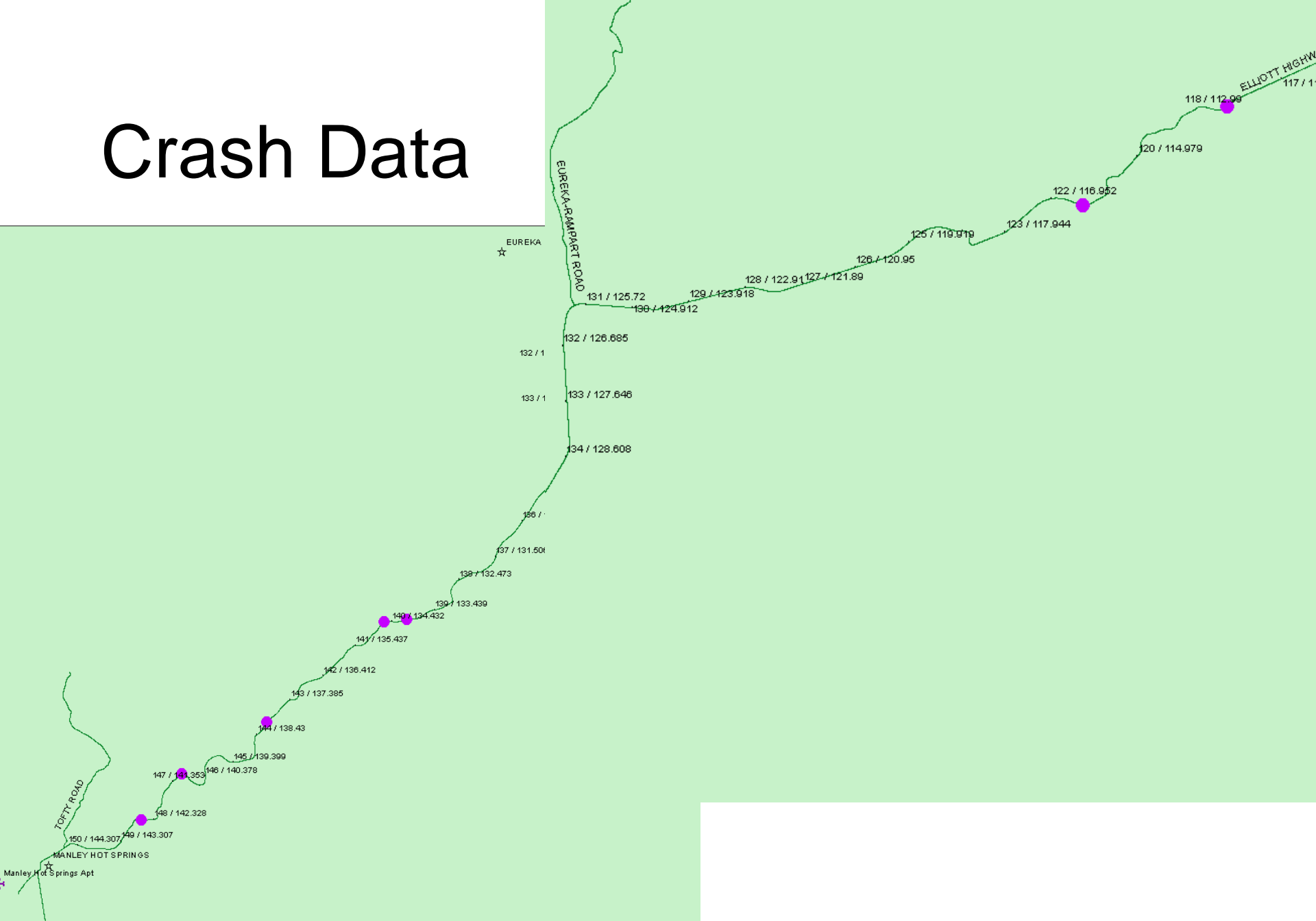
Do Not Assume

RSA Team Review

- Data Review
 - Planned projects, construction history
 - Traffic volumes
 - Existing Infrastructure
 - Crash Reports
 - Crash Statistics
- Field Review
 - Day / Night
 - Observe Intersections/turn-outs
 - Field review of serious crash sites



Crash Data



Public Meeting





Idea Parking Lot



- Identified Risks are documented/ photographed
- Potential countermeasures discussed in next step

Field Review = Brainstorm

**No Question
or observation is stupid**

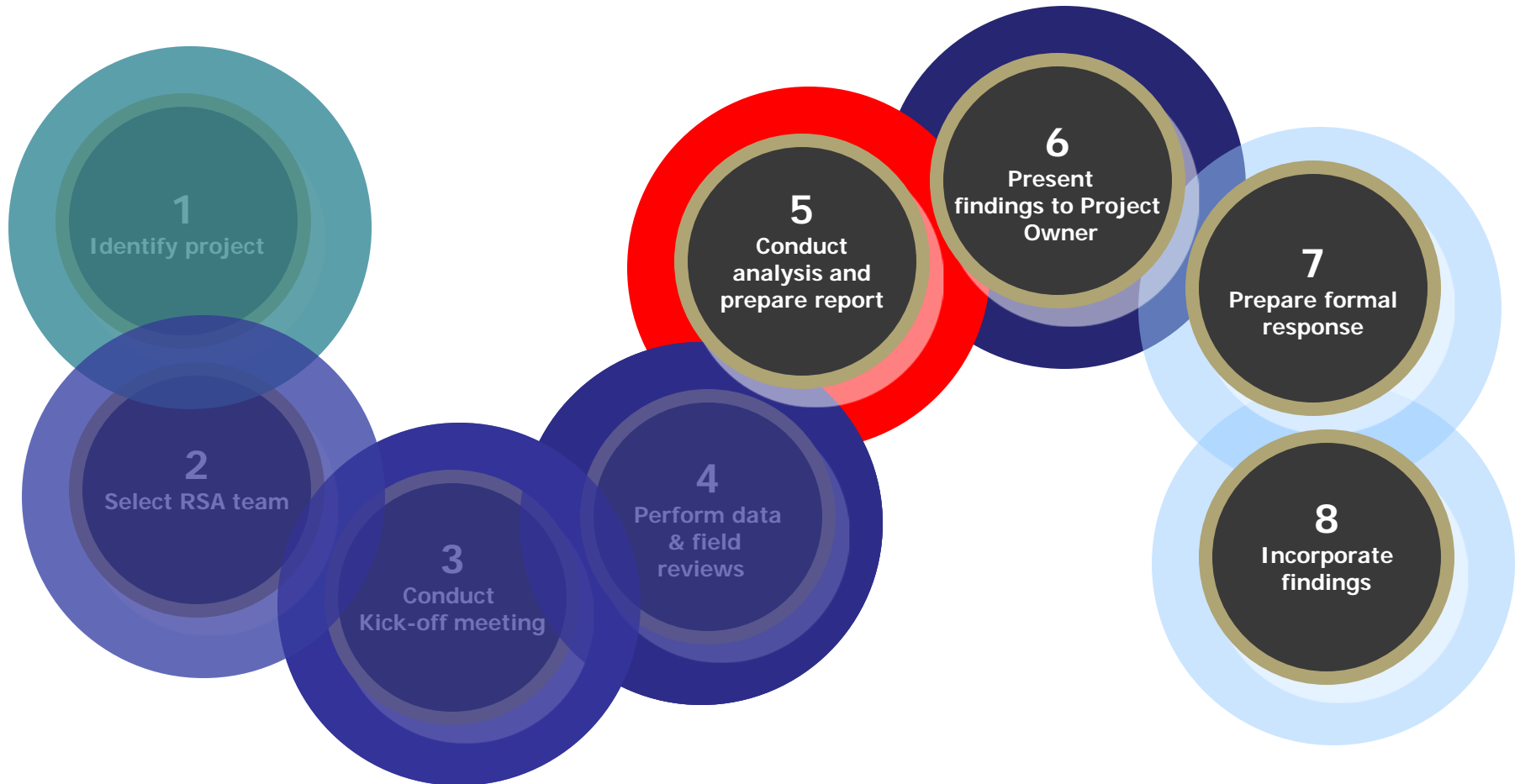


Responsibilities



RSA Team

Design Team / Project Owner



Risk Assessment Scale

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Risk Levels

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Risk 1: Sight Distance @ Farmingdale



- **Description of Risk:**
 - Vehicles turning left from Farmingdale to SR-125 WB have obstructed sight distance due to embankment and vertical profile on SR-125. Vehicles pull past stop bar to turn left.
- **Collision types experienced:**
 - Turning, Angle, Rear-End, Intersection related
- **Location:**
 - SR-125 & Farmingdale Rd Intersection
- **Solutions:**
 - **Low Cost:** Move stop bar closer to SR-125 while avoiding turning path of trucks/buses.
 - **Intermediate Cost:** Reduce embankment height in Southeast corner.
 - **Ultimate:** Reconstruct SR-125 with vertical profile that allows for proper sight distance.

Severity	High	Risk Level D
Frequency	Occasional	

Dalton Junction Double Arrow



Pullout @ MP 94.5



Trooper & Public Identified issues
Pull out in curve = Alignment difficult to detect in winter
Reverse Super in pullout

Pullout @ MP 94.5



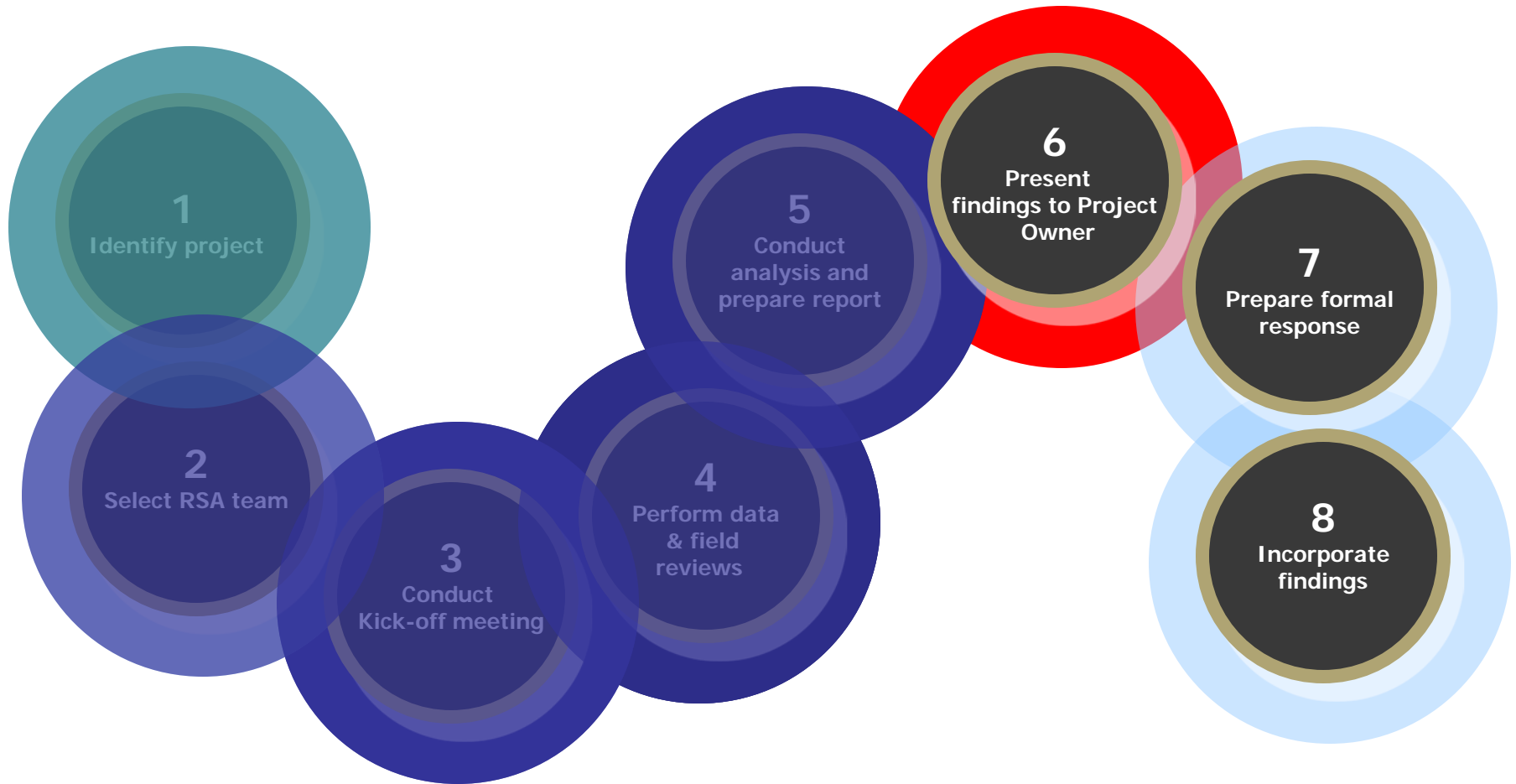
Trooper & Public Identified issues
Pull out in curve = Alignment difficult to detect in winter
Reverse Super in pullout

Responsibilities



RSA Team

Design Team / Project Owner



RSA Report

- Presentation to owner
- Written Report
- Request for feedback

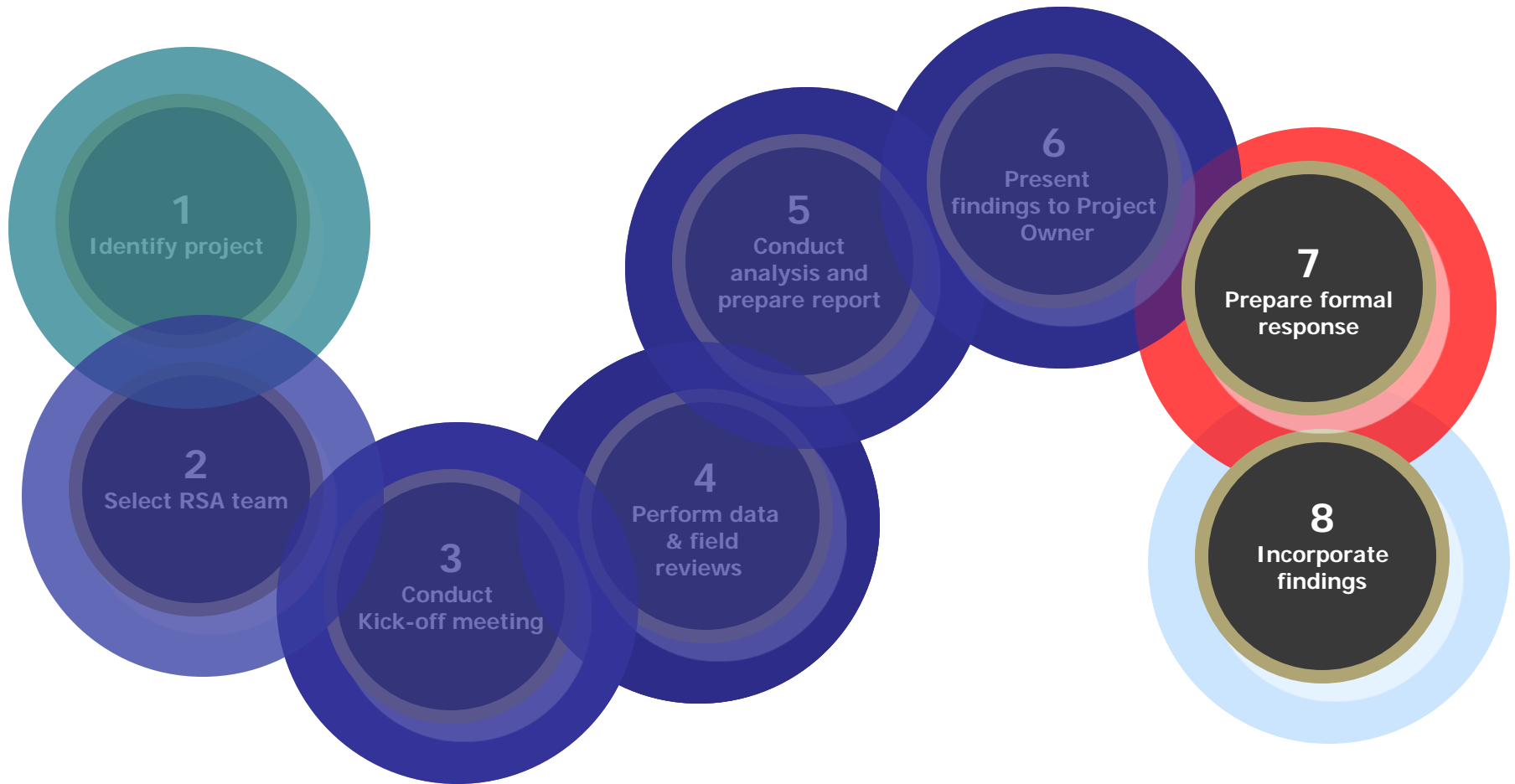


Responsibilities



RSA Team

Design Team / Project Owner





**RSA Report
is not
for the
Round File!**





Owner's Response

- Written response
- Improvements to be made
- Reasons for non-implementation

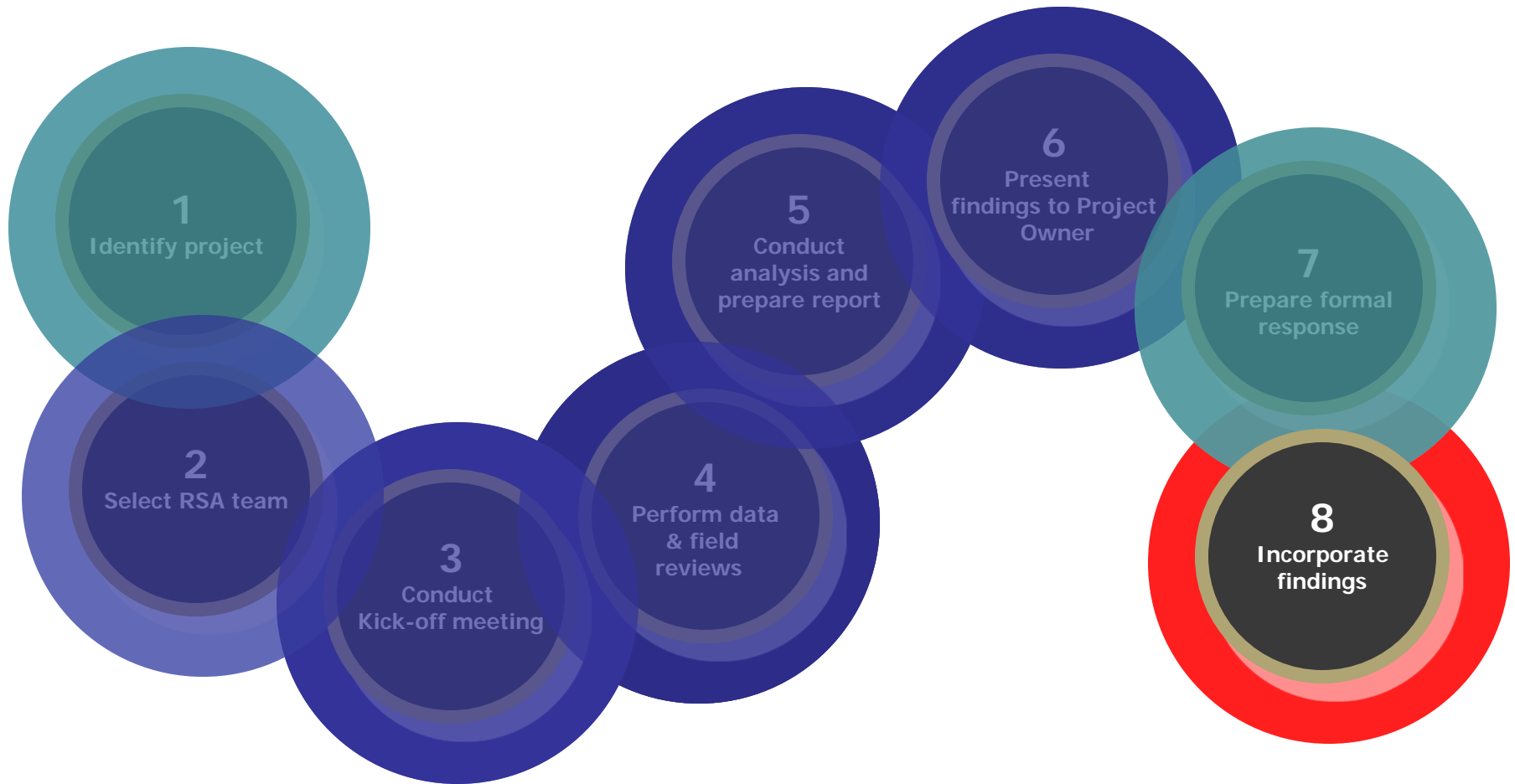


Responsibilities



RSA Team

Design Team / Project Owner



State Response



Questions?



Questions?

1
Identify project

2
Select RSA team

3
Conduct
Kick-off meeting

4
Perform data
& field
reviews

5
Conduct
analysis and
prepare report

6
Present
findings to Project
Owner

7
Prepare formal
response

8
Incorporate
findings