Mobile Data Collection Applications

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FOREST FIRE MANAGEMENT VICTORIA

Planned Burn Aerial Ignition

- Application brief
  - Develop a mobile application that can be used by Incendiary Operations Supervisors (IOS) and Bombardiers to assist aerial ignition operations
- Product requirements
  - Interactive map that overlays aircraft position against ignition map
  - Ability to track progress of ignition operations
  - Ability to record observations and share in real time with Burn Controllers and teams.
  - Automation of data management where possible.

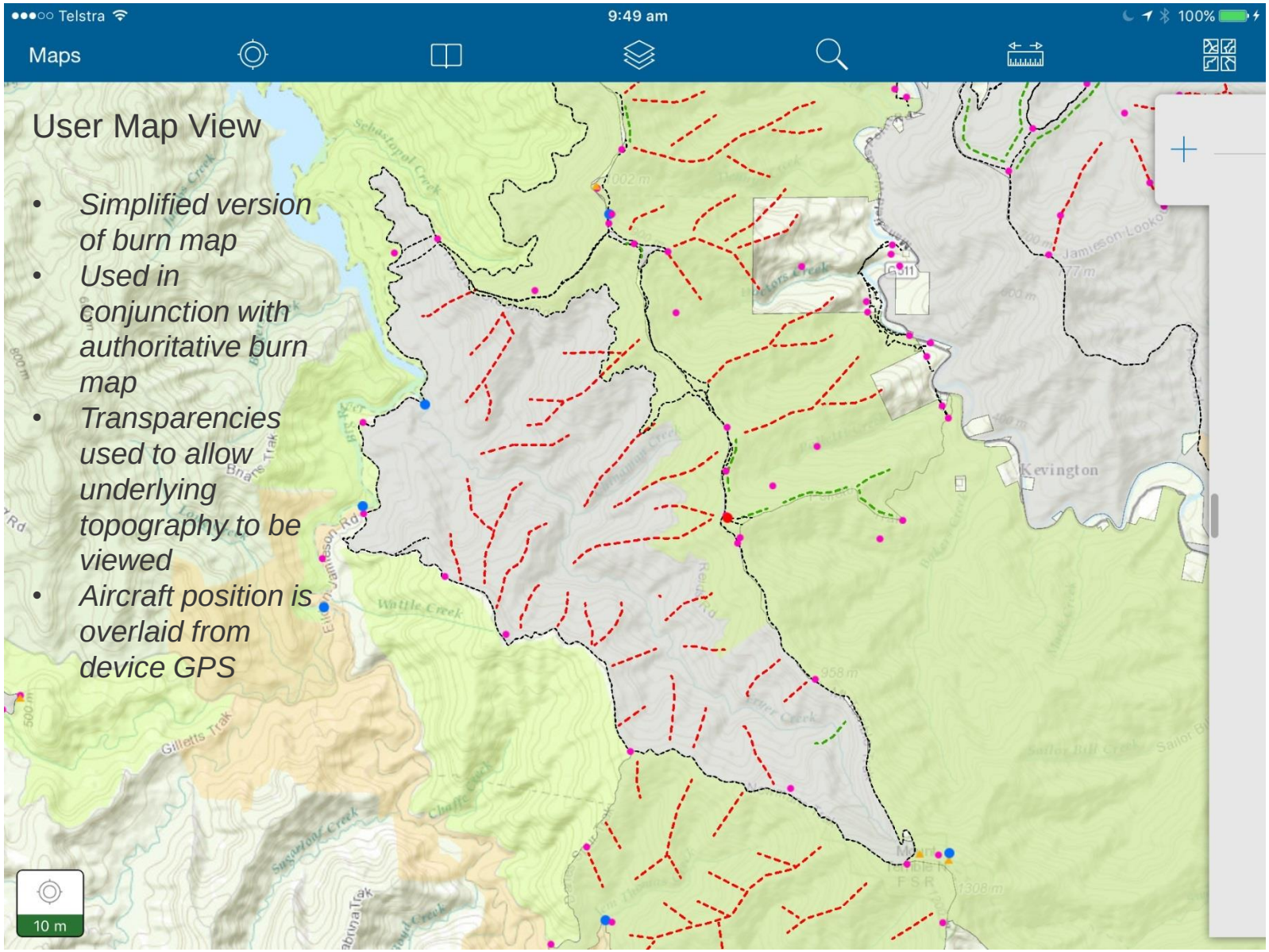
Planned Burn Aerial Ignition

- Design considerations
  - Where to source tactical data from?
  - How to collect observation data?
  - How to share observation data effectively?
  - How to manage network access and reception issues?

Planned Burn Aerial Ignition

- Design Solution
  - Mobile app designed using ArcGIS Collector
  - Tactical data sourced from Fireweb and incorporated into web service via ArcGIS
  - Web service regularly updated to AGOL using automated Python script
  - Observations collected in ArcGIS Collector and shared with Burn Controllers via custom web app
  - Observation spatial data scraped from AGOL via Python script and published to GISDesk for use in other software products.

Planned Burn Aerial Ignition



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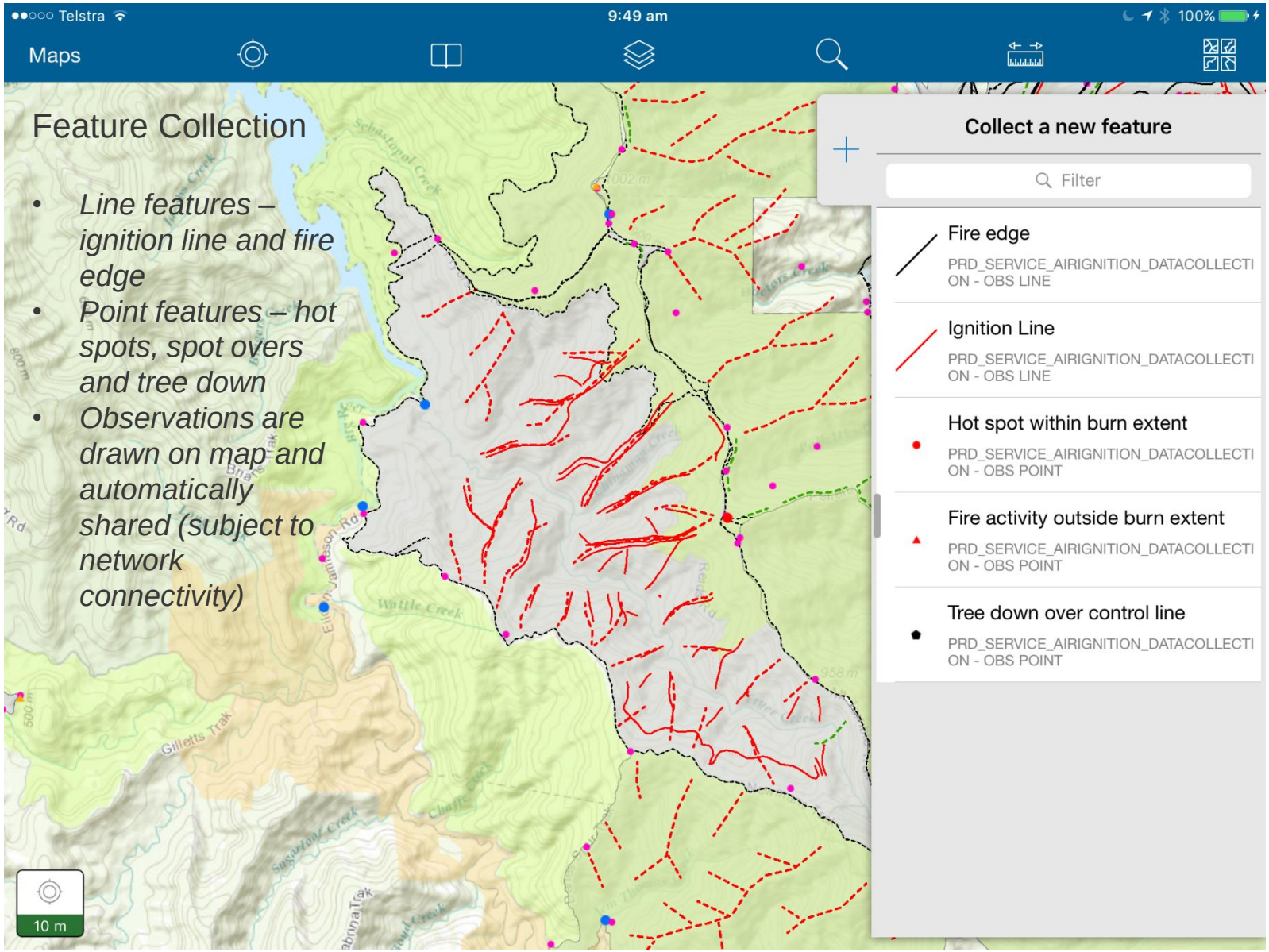

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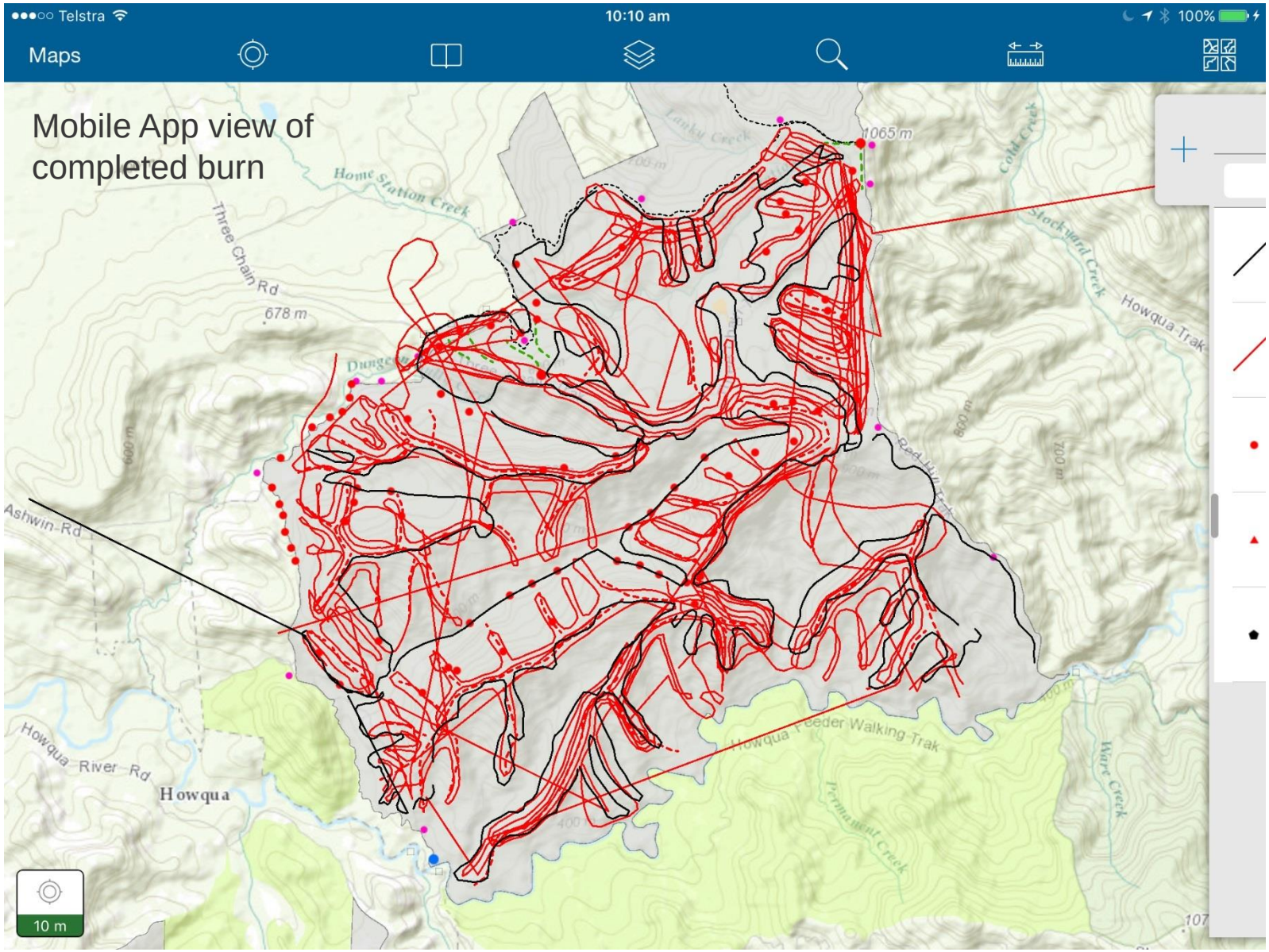

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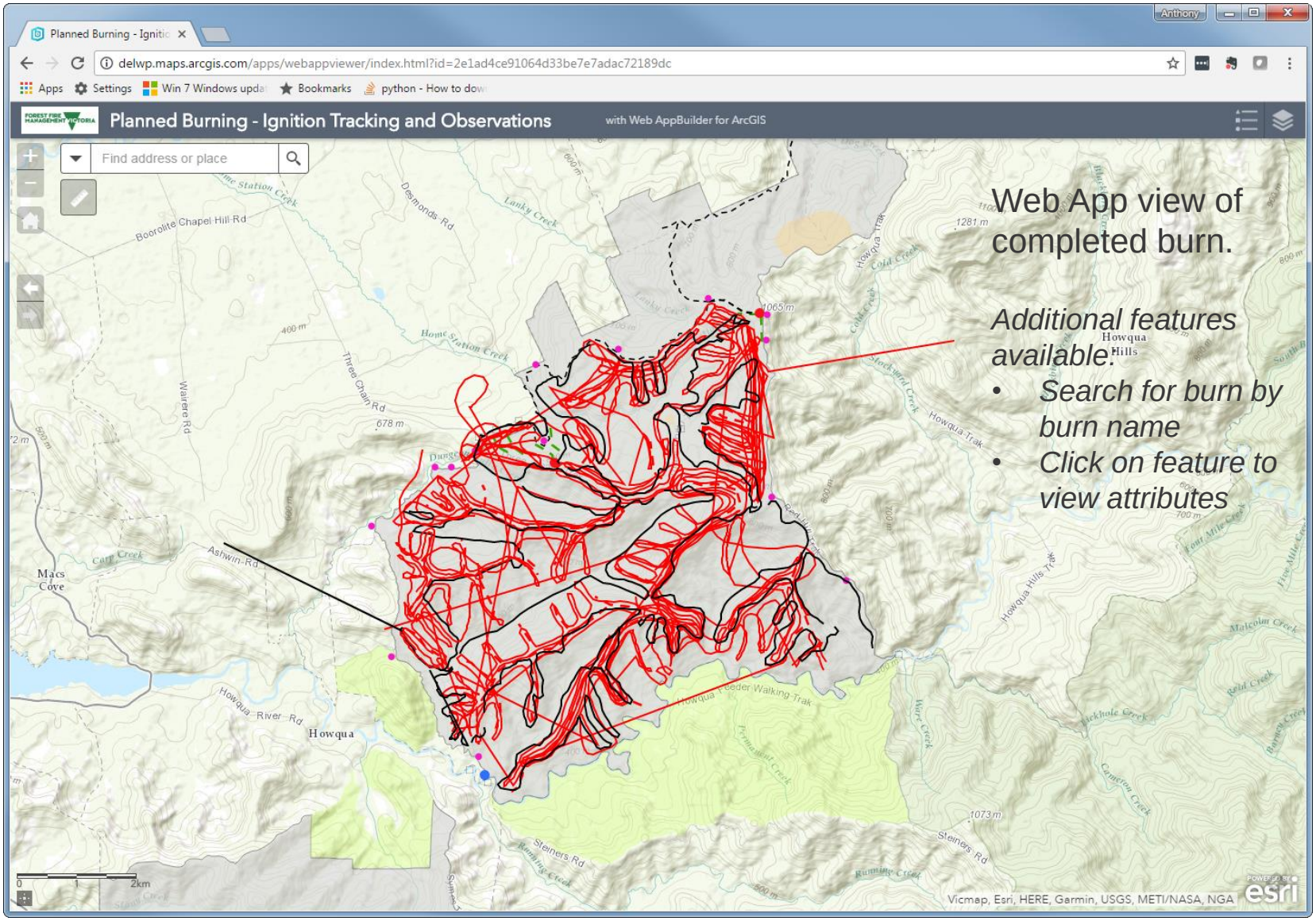


Planned Burn Aerial Ignition

- Dealing with network connectivity
  - ArcGIS Collector allows for apps to be ‘checked out’ for working offline.
  - This allows a background map to be downloaded and cached, and generation of replica databases for any services used in the map.
  - Once an app is taken offline, data is no longer automatically synced with AGOL, and is reliant on the operator either manually forcing a sync when back in coverage, or the offline app being checked back in.
  - It is not possible to update map services (eg tactical features) if a copy is checked out to a user.

Planned Burn Aerial Ignition

- Dealing with network connectivity (continued)
  - Air ignition crews will often be deployed to multiple burns at a time, in geographically separate locations.
  - This will often not allow easy ‘checking out’ of projects as only a single area can be checked out at once. Trying to check out a contiguous area for all of the burns can be time, storage and data- intensive.
  - Solution is to run a number of ‘duplicate’ ArcGIS Collector projects that can each have a single area or burn checked out.

Planned Burn Aerial Ignition

- Feedback from users
  - Very easy to access app
  - Intuitive to use – using touchscreen swipe, pinch in, pinch out makes it very easy to navigate around
  - Very easy to record observations
  - Use of app on iPad rather than heavier option such as Tuffbook makes use functionally easier in aircraft.
  - iPad device availability means that use can be scaled up very quickly if need be, versus limited availability of specialised devices such as Tuffbooks.

Planned Burn Aerial Ignition

- Planned Improvements
  - Improvements to symbology – currently difficult to interpret some symbology
  - Improvements to ‘fire edge’ feature – either remove feature or change symbology 24 hours after observation
  - Improvements to ‘ignition line’ feature – change symbology after 24 hours (to account for multi day ignition plans)
  - Additional features to allow collection of ‘crown scorch’ and ‘crown burn’ areas

Planned Burn Aerial Ignition

- System / Infrastructure Issues
  - Native access to eMap tactical feature data would significantly simplify service publication process.
  - Vicmap API basemap is not able to be checked out for offline use. This means we are not using an authoritative base map (using ESRI basemap) which has known issues.
  - Vicmap API basemap does not include topography or relief at usable scales. This could be resolved through creation of a topography overlay service that could be overlaid on the Vicmap API where required.

Culvert Inspections (proof of concept)

- Application brief
  - Design a solution that allows simple recording of culvert inspections and works, to replace a current paper based system.
  - System needs to allow of verification and updating of key attributes (asset type, size, length etc) and also updating of spatial location where necessary.
  - System needs to allow for the capture of new features.
  - System also needs to log every inspection of an asset, as opposed to the last inspection of an asset.

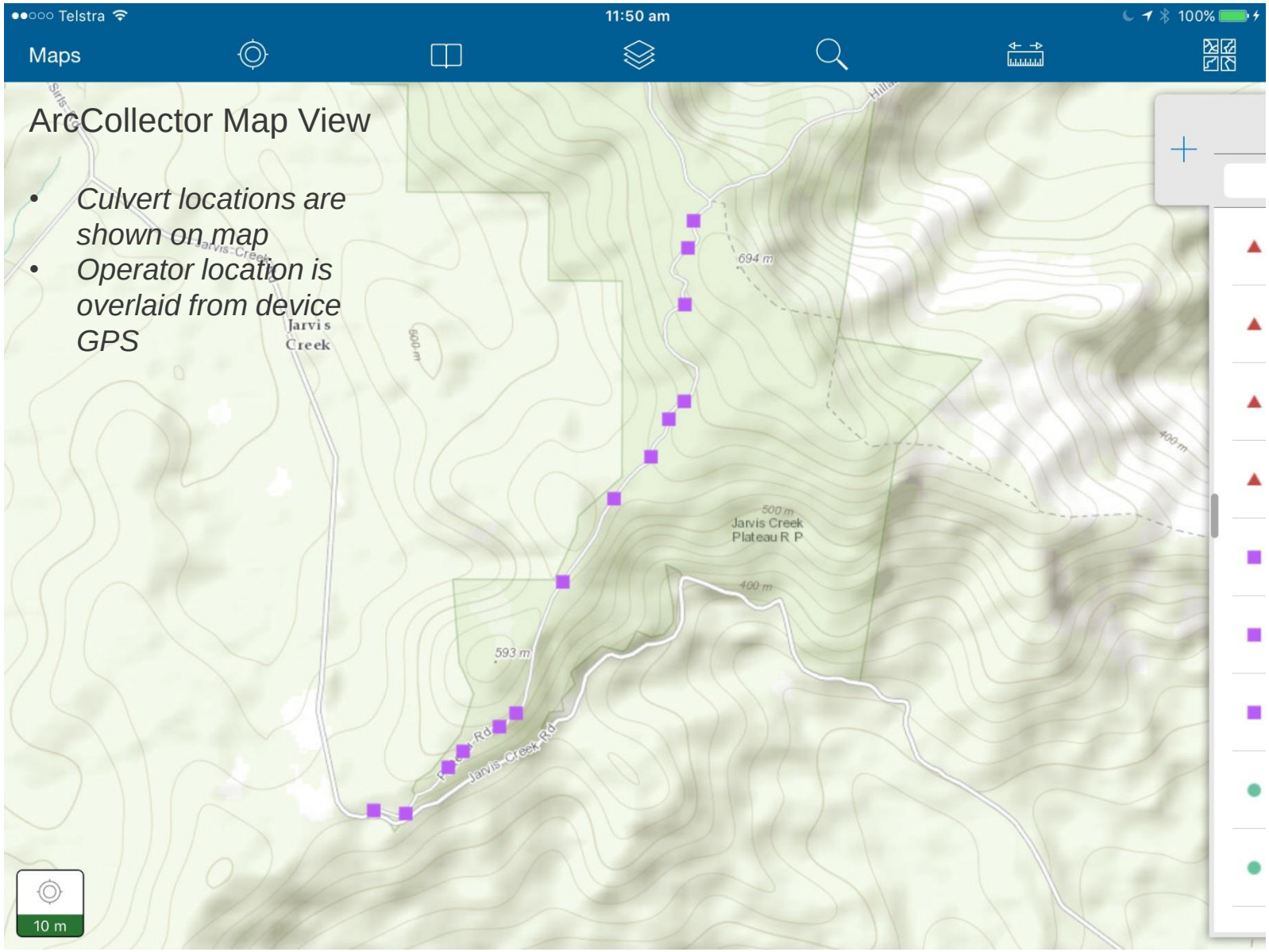
Culvert Inspections (proof of concept)

- Design solution
  - A blended solution of ArcGIS Collector and Survey123.
  - A Survey123 survey can be ‘automatically’ opened and survey answers pre-populated on a mobile device via a *http://* call.
  - *http://* call can be generated automatically based on Survey ID, attribute names and attribute values.

Culvert Inspections (proof of concept)

- Design implementation
  - Design an ArcGIS Collector app with point data showing location of assets.
  - Point data needs a field with unique http:// call for that record.
  - Operator uses ArcGIS Collector to navigate to and identify an asset, and to automatically open a S123 form for confirmation of asset attributes and collection of inspection data.
  - Automated process is run periodically to interrogate S123 and to update point source asset data. (To be developed).

Culvert Inspections (proof of concept)



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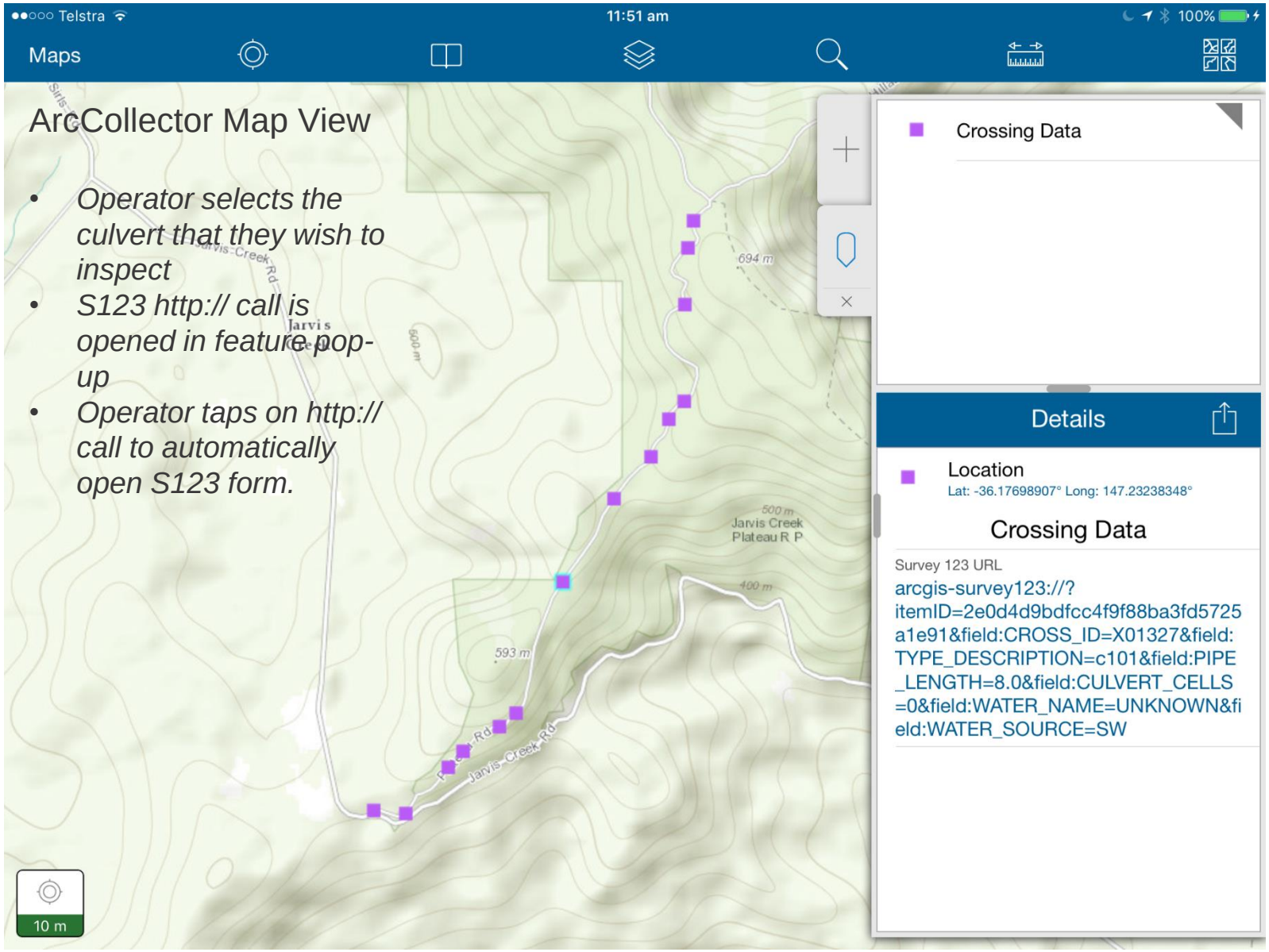

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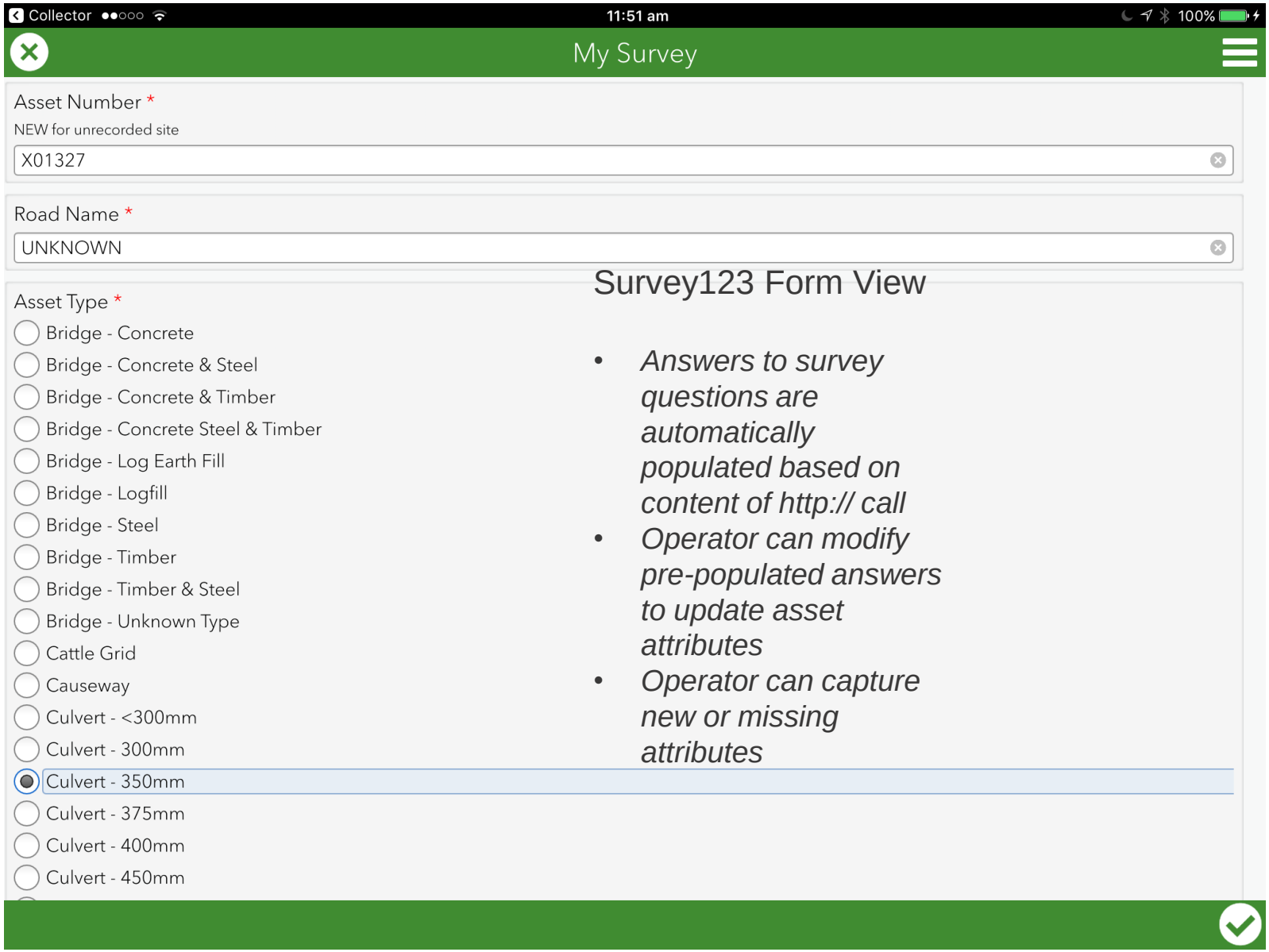
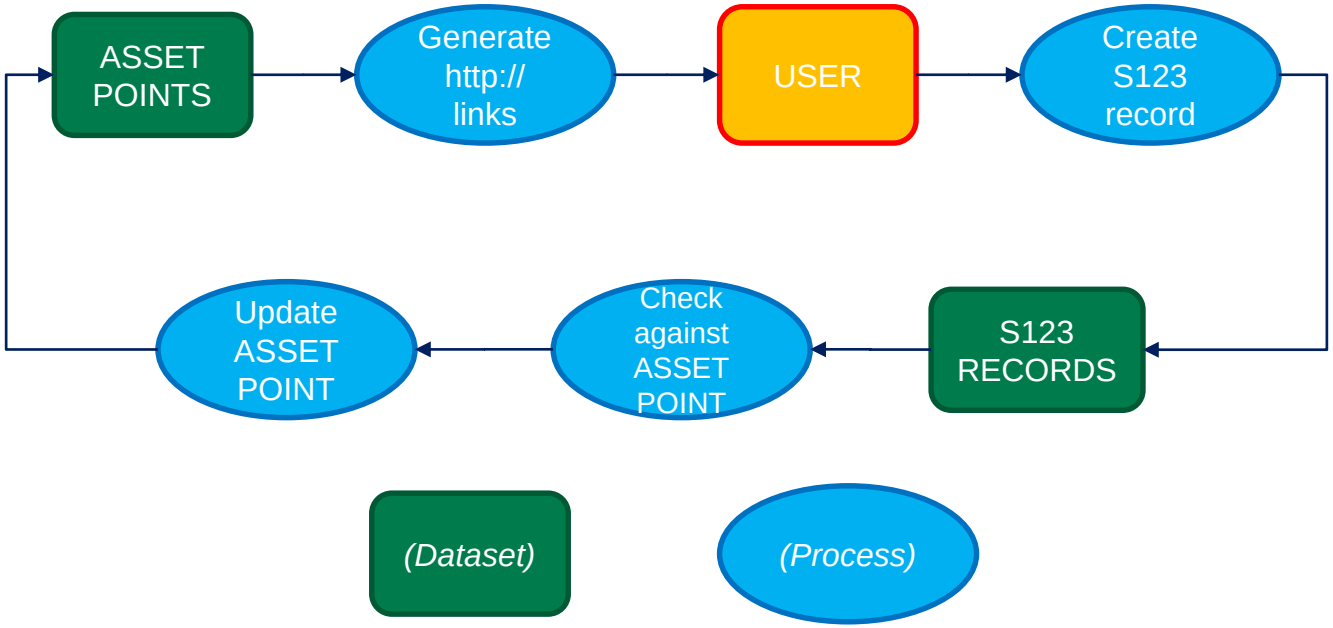


Survey123 Form View

- *Answers to survey questions are automatically populated based on content of http:// call*
- *Operator can modify pre-populated answers to update asset attributes*
- *Operator can capture new or missing attributes*

Culvert Inspections (proof of concept)

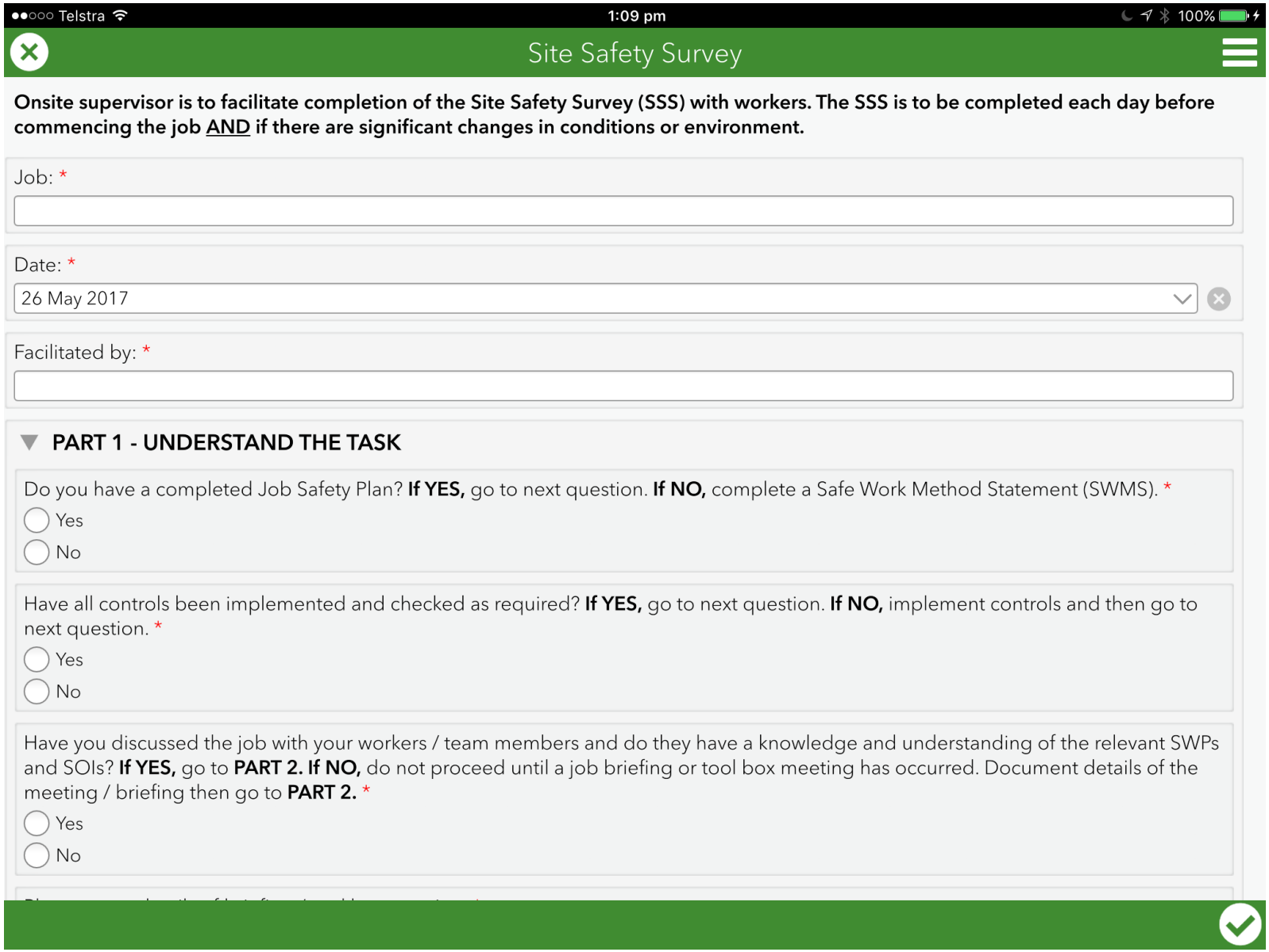
- Processing model



Site Safety Survey (work in progress)

- Project brief:
  - Develop an online survey in Survey123 that replicates existing site safety survey requirements.
- Application benefits:
  - Transition away from an existing paper-based system with variable record keeping to an electronic system.
  - Ability to create a spatial record of site / works locations.
  - Automated date / time stamping of record creation – will assist quality assurance and auditing of safety systems.
  - Ability to trigger various events based on SSS answers (for example: incident or near miss triggers an email notification to Works Coordinator).

Site Safety Survey (work in progress)



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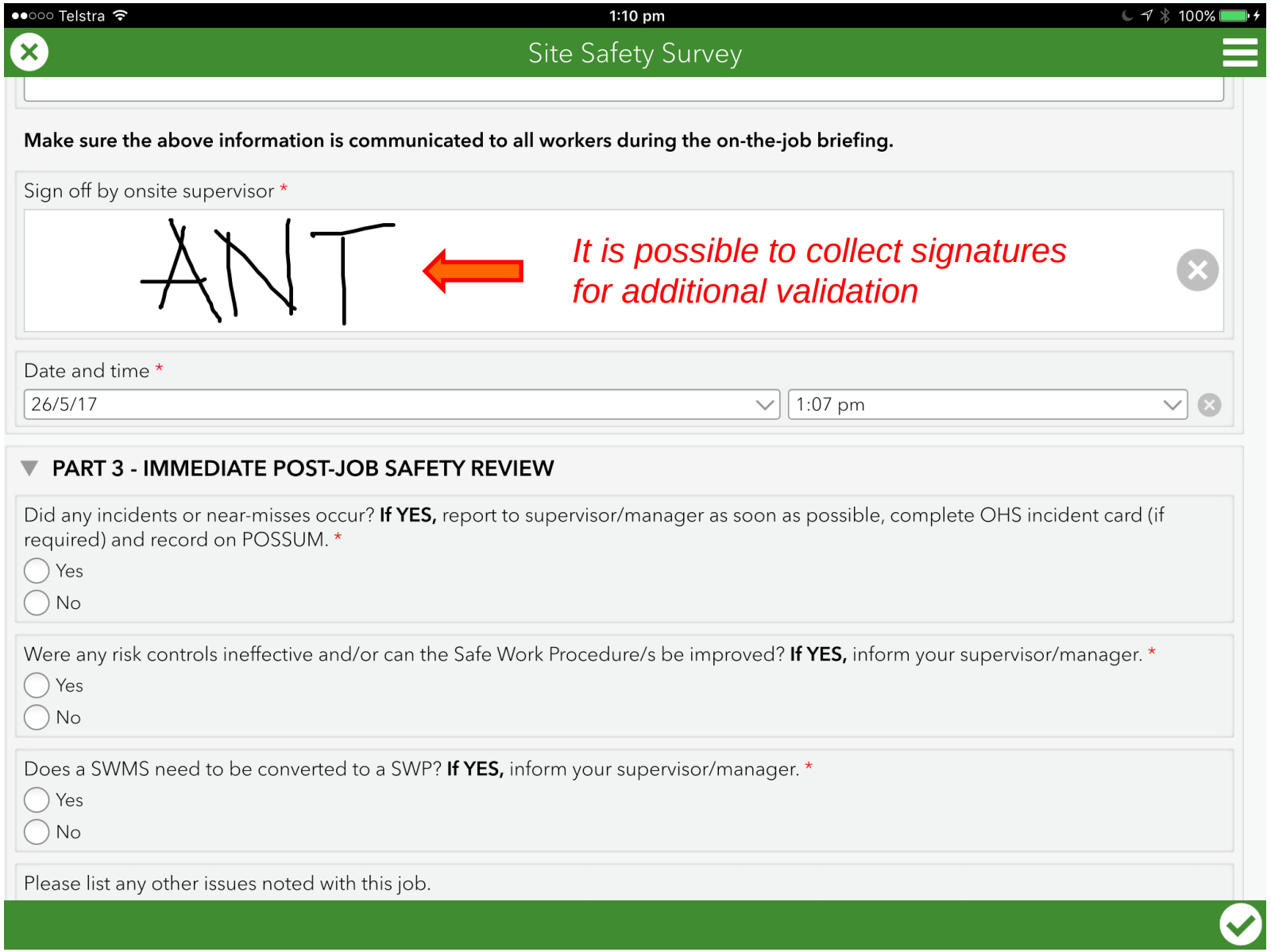

Project and data management considerations

- Interacting with services, collected data and other software applications.
  - Where possible we should be relying on automating processes for publication and updating of services, and harvesting of data, as this allows methodology to be reliable and repeatable.
  - Currently using *Python* and *arcrest* module to publish services and harvest collected data. While this is achievable for operators with an intermediate level of experience with Python, it will be out of reach for many people wishing to design or utilise field data collection apps.
  - Using AGOL as opposed to Portal can make interaction with data more complex, however AGOL provides portability and potentially reduces reliance on a DELWP network connection.

Project and data management considerations

- Backing up of collected field data.
  - Manual processes can be set up on a per-project basis, but there is no centralised backing up or archiving.
  - A move from AGOL to Portal would bring field collected data into the DELWP ecosystem, which would then provide backup, archiving and disaster recovery if needed.

- Management of data services
  - Publication of authoritative CSDL datasets and/or views to AGOL would allow users to access this data directly for their apps. This would eliminate the need to users to generate and publish their own static cuts / views of CSDL data.

Project and data management considerations

- Ongoing management of apps and field data
  - Regional GIS has mature and documented data classification & management protocols.
  - These protocols guide how to classify spatial data (project, business or corporate), where this data should be stored / published, and how data should be documented.
  - These protocols may be adaptable to our use of AGOL.