



Contemporary Web Cadastre

Presentation to: The 14th South East Asia Survey Congress 2017

16th August 2017

Peter Barratt
myCadaastre Pty. Ltd



Prof. Don Grant AM, RFD

Chairman, Adviser NSW Surveyor General (retired), Consultant

- A thought leader and Land Administration Advisor at senior and Ministerial level.
- Focus on institutional reengineering, strategic planning and cadastral reform



Peter Barratt

Solution Architect Land Surveyor → IT focused

- Broad industry experience having worked in ICT & Project Management, Solution and Technical Architecture, Team Leadership and Domain Specialist roles



Freddie Sia

Senior Developer IT focused → Lands Domain

- A computer scientist that has specialised in spatial data processing for over 30 years.
- Broad international and industry experience having worked in fifteen countries.



Dr. Roger Merritt

Adjustment Specialist Land Surveyor → IT focused

- A powerhouse of knowledge when it comes to complex algorithmic development and finding innovative solutions to mind-bending cadastral problems.



Phill Dance

Business Manager Land Registry domain focus

- specialised in modernising land information systems and providing the highest availability solutions possible, via Web services on secure, private cloud technology.


About Us

- Collectively, over one hundred and fifty years of knowledge in the Registry, Lands and Cadastral Custodian domains
- We have worked widely and internationally
- We undertook the ePlan mapping of LandXML and internal business case for NSW
- We have been involved at different levels in the design and renewal of several large scale Cadastral Processing Systems
- We understand the domain and we care about this problem space

We are seeing clear drivers of change towards a Cadastre that is ...

- Accessible → freedom of access, ubiquitous, democratised
- Collaborative → created and maintained by multiple parties
- Sustainable → economically viable, with support of community
- Adaptive → well designed to be resilient with change
- Efficient and Effective → automate where possible, simplify where not
- Fit for purpose → performs the processes required for stage of evolution

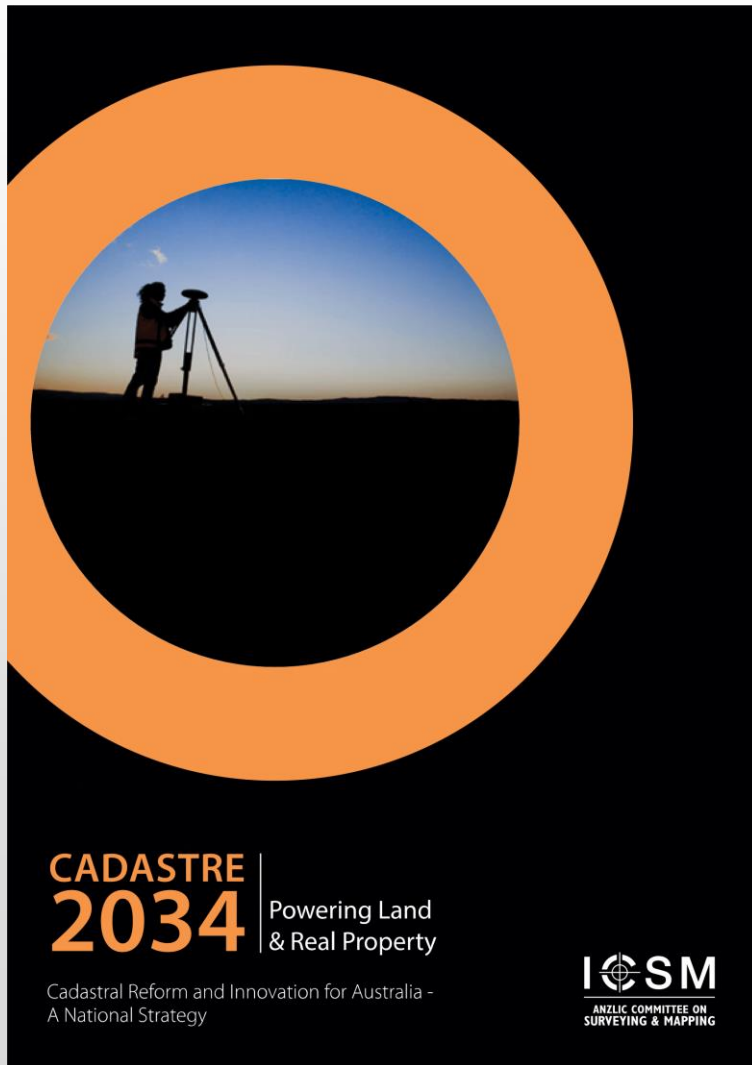
Timeline ...

- 
- 1960's Introduction of computer graphics capabilities ('sketchpad' Ivan Sutherland MIT)
 - the beginnings of the possibility of digital mapping
 - standard survey reduction and adjustment program development
 - 1970's The era of digital cartography and mapping begins ...
 - mini computers, photogrammetric and mapping systems
 - 1980's Back capture and digitisation, attribution, query and the beginning of GIS...
 - desktop computing, launch of the Free Software Movement (Richard Stallman)
 - 1990's Cadastral mapping systems built on (typically) file based GIS systems
 - www, html, uri, http (Tim Berners-Lee) → W3C, founding principles for "open-ness"
 - 2000's Cadastral systems built/migrated to spatial databases but now **requiring only a subset** of the improved GIS capabilities, Google maps and industry wide growth of web mapping
 - a growing eco-system of geospatial open source projects and supporting technologies: mapServer, geoServer, GDAL, proj4, JTS, open-layers, etc
 - github (2008), open source projects (OSS), OSGeo (2005), growth of web mapping,
 - standards, JSON, XML, GML and in particular LandXML
 - 2010 - Government acceptance of OSS as a mature s/w base
 - the beginnings of Open Data, Open Government, Open Access

where next ??

Cadastral 2034

<http://www.icsm.gov.au/cadastral/Cadastral2034.pdf>



A Vision for Cadastral 2034

"A cadastral system that enables people to readily and confidently identify the location and extent of all rights, restrictions and responsibilities related to land and real property."

In future, citizens will know what can be done on land (rights), what cannot be done (restrictions) and what must be done (responsibilities).

Cadastral 2034 has five goals, to achieve a system that:

- is fundamental to land and property ownership and is sustainably managed;
- is truly accessible, easily visualised, and readily understood and used;
- is fully integrated with broader legal and social interests of land;
- provides a digital representation of the real world that is survey accurate, 3- dimensional and dynamic; and
- is a federated cadastral system based on common standards.

The ePlan Initiative: improve/automate processing: LandXML

An ongoing process to enable Australian jurisdictions to facilitate the Electronic Lodgement and Transfer of Survey Data

- ePlan Protocol documents finalised and ratified by the ICSM in November 2010
- Four States QLD, NSW, VIC, SA have published their jurisdictional schemas
- Various levels of implementation progress are currently in play by the different States

<http://www.icsm.gov.au/ePlan/>

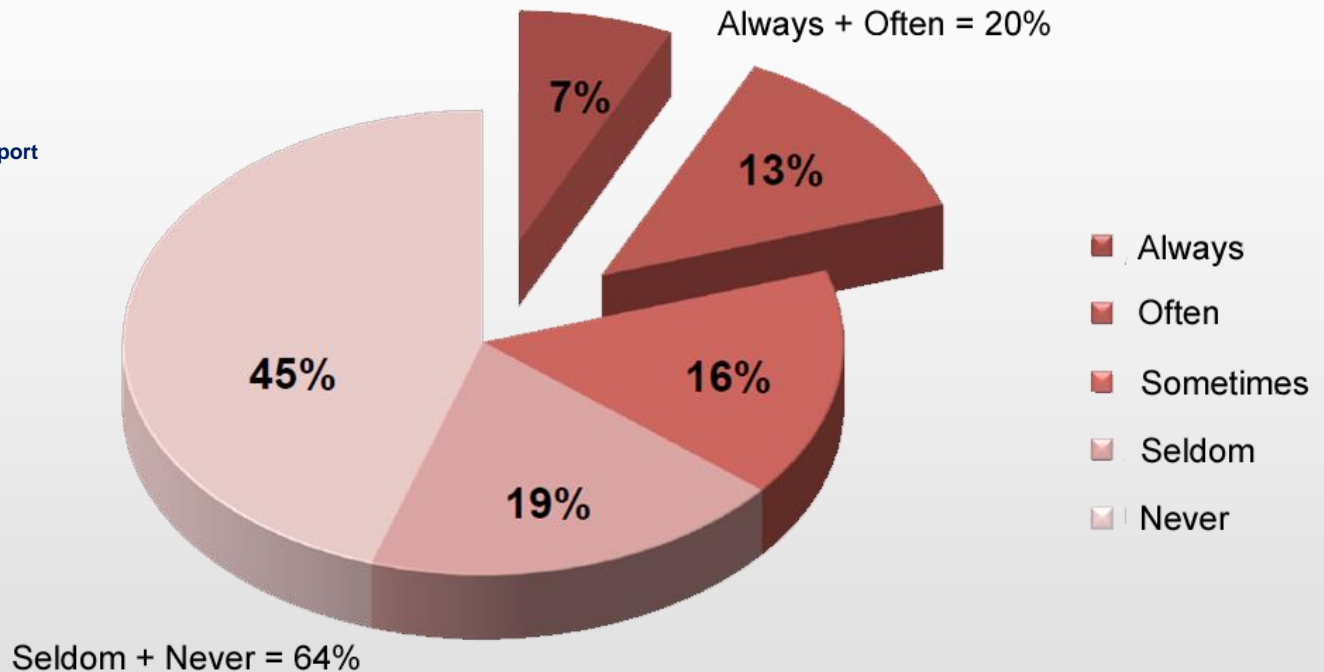
- Surveyors can complete online cadastral infrastructure searches of jurisdictional databases and receive standard LandXML survey data downloads
- Create a cadastral survey (data) plan using proprietary vendor applications that is suitable for lodgement with the relevant jurisdictional authorities
- Have ePlan data visualised, validated and approved by the relevant jurisdictional authorities as a spatially and legally valid instrument for land title registration

The Software Dilemma

Pareto's principle

Source:

TheStandish Group - CHAOS Report



- Vendor software usually contains non-essential functionality (for cadastral operations)
- Purchase and pay maintenance on 100%, actual use ... 20%
- Typically requires investment in Professional Services for a solution or configuration

The Open Source Dilemma



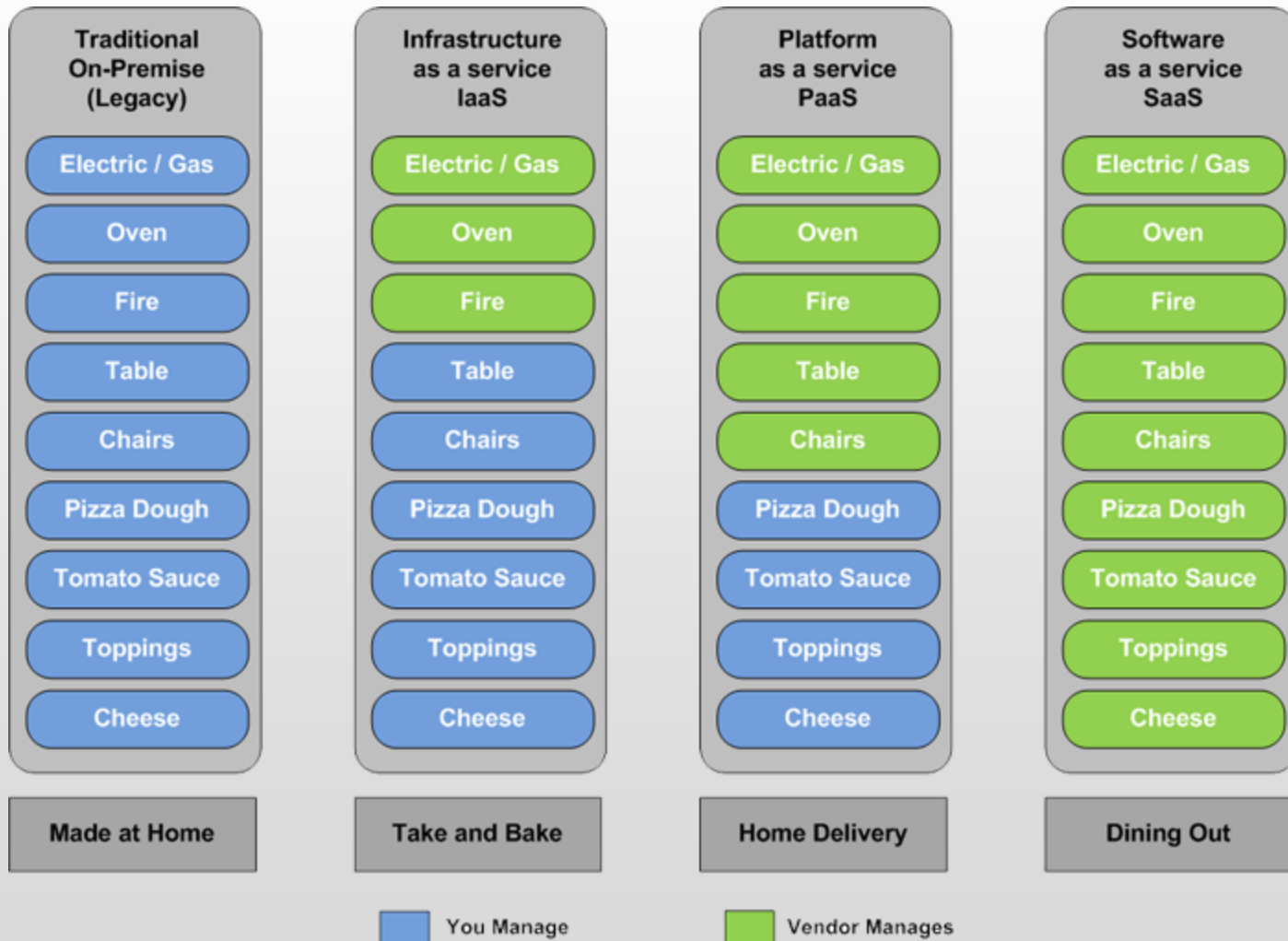
- One almighty jigsaw of components and a changing landscape
- Lack of resources and/or time to undertake the R&D to identify usable elements
- Often placed in the “*too hard*” basket
- There is always a cost somewhere
- Key business functionality is **usually missing** !

The Platform Dilemma

- **Traditional (on-premise) / behind the firewall**
the current state for many organisations, in-house hardware, system admin, mixed software environment
- **Infrastructure as a Service (IaaS)**
is a form of cloud computing that provides self-provisioned virtualised computing resources over the Internet e.g. Amazon VPC, Rackspace
- **Platform as a Service (PaaS)**
provides an environment for the consumer to load, configure and run their own or acquired s/w applications in a pre-configured environment using programming languages libraries, services and tools supported by the provider e.g. MS Azure, IBM BlueMix
- **Software as a Service (SaaS)**
cloud based applications that are accessed via the internet and whose data is stored/saved in the cloud. Sometimes called web-based, on-demand or hosted software, Usually provided as a subscription service hosted on a SaaS provider's servers e.g. Office365, Salesforce, Xero



Pizza as a Service (the Executive version)



Core Capabilities

- **Capture**
the ability to capture parcel and/or strata information accurately and efficiently directly from the plan document or via a structured data input (e.g. LandXML)
- **Update**
to add the captured new plan parcels or strata unit data to the authoritative digital cadastral fabric
- **Upgrade**
to incrementally improve the spatial accuracy of the cadastral fabric
- **QA and Edit**
the ability to identify and rectify topological and dimensional error in the cadastral fabric
- **Conflate**
harmonising two cadastres to provide accurate re-alignment of the cadastral fabric and associated layers
- **Collaboration**
to provide a platform that enables parties to work together - collaboratively and seamlessly

Custodian Challenges

Cost of Ownership

Spatial Accuracy

How to leverage ePlan Data?

Cost of using ePlan to create fabric

Consistency with ubiquitous high resolution imagery

Timely Cadastre by acquiring and managing full lifecycle ePlan Data

Poor system performance

Business Agility

Risk mitigation

- ✓ OSS can offer cost reductions
- ✓ Fast upgrade processes
- ✓ Automated ePlan ingestion
- ✓ Automated parcel fabric creation
- ✓ Simple “Ortho” adjustment
- ✓ Process pipeline for versioning of “proposed” plans
- ✓ Low friction services / database access
- ✓ Improve ability to focus on delivery services
- ✓ Simplified processes

Decision Time

- Is there a need and a market ?
- Do we have sufficient core competency ?
- What are our current code and knowledge assets ?
- How much re-engineering and new engineering effort are we prepared to do ?
- What is our target architecture and deployment environment ?
- What are the core technologies that we would target ?
- Where are the processing boundaries ?
- Approach

Basic R&D and early prototyping

Creation of reusable pattern frameworks for web-services, micro-services and scaffolding for client applications

Creation of data-centre (VPC) and build/deployment pipelines

Creation of test cases

and then **JUST A LOT OF HARD WORK !!**

Cloud Storage

- *Maintenance Cadastre*
- *Working Cadastre*
- *LandXML Plans*
- *Delivery Cadastre*



LandXML documents

- *non proprietary*
- *well supported*
- *easy to understand*



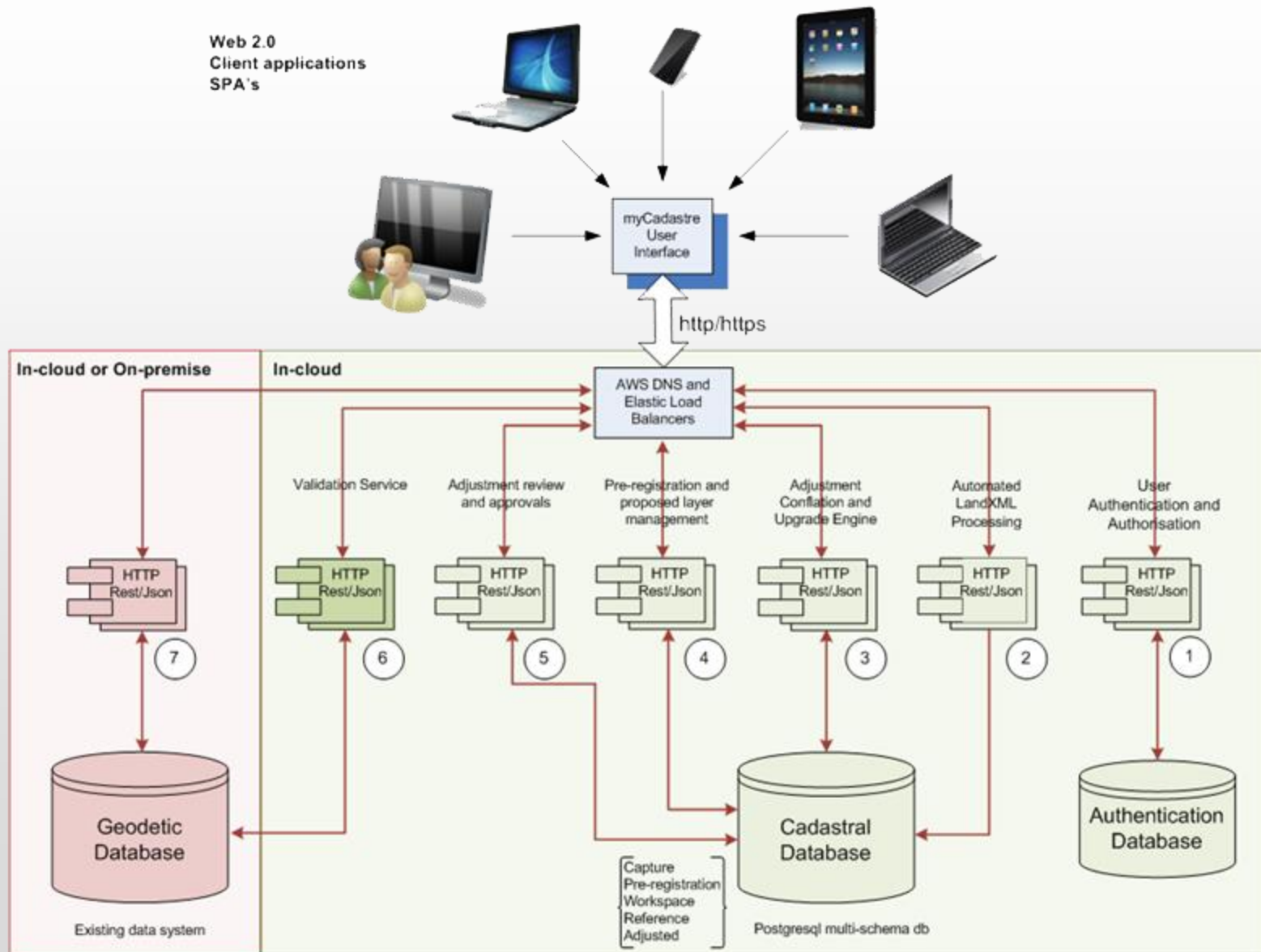
Cloud web-services

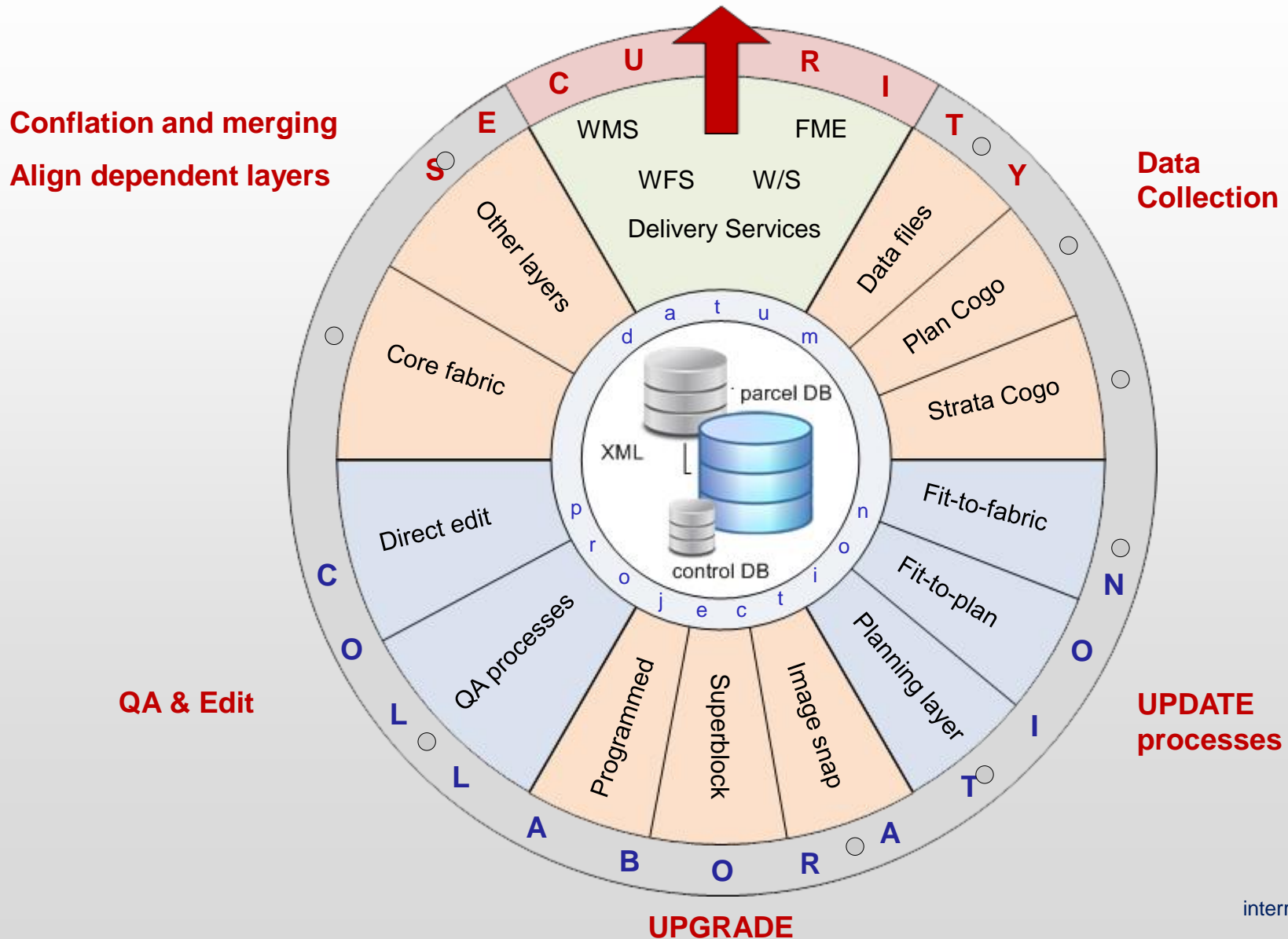
- *Plan capture*
- *Validation*
- *Search, View, Update*
- *Cadastral maintenance*
 - *update (fit-to-fabric)*
 - *upgrade*
 - *layer/asset alignment*
 - *conflation*
 - *datum transformation*

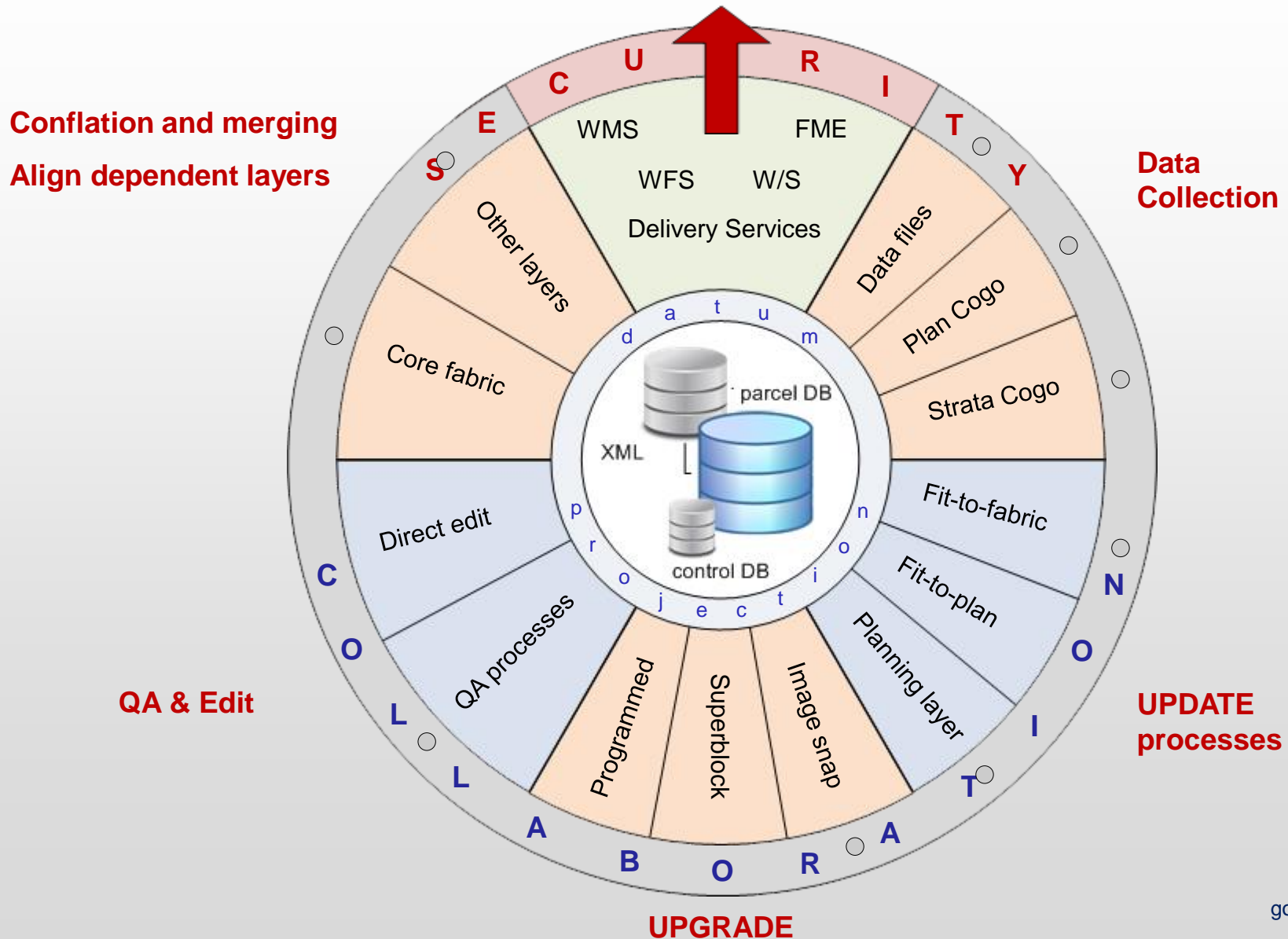


Users

- *access via browser*
- *desktops, tablets, mobile*
- *database storage with easy access*







LandXML

```

▼<LandXML xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns="http://www.landxml.org/schema/LandXML-1.2"
xsi:schemaLocation="http://www.landxml.org/schema/LandXML-1.2 http://www.landxml.org/schema/LandXML-1.2/LandXML-1.2.xsd"
time="21:34:19" date="2017-06-27"
  ▼<Units>
    <Metric directionUnit="degrees" distanceUnit="m" volumeUnit="cubic m"/>
  </Units>
  <CoordinateSystem verticalDatum="WGS84" horizontalDatum="WGS84" srs="EPSG:31466"/>
  ▼<FeatureDictionary version="1.0">
    <DocFileRef name="au-gov-nat" location="http://www.lpi.nsw.gov.au/landxml/101013.xml"/>
  </FeatureDictionary>
  <Application version="cCogo" cCogo="1.0" cCogoRef="http://www.lpi.nsw.gov.au/landxml/101013.xml"/>
  ▼<CgPoints zoneNumber="54">
    <CgPoint name="1" state="existing" pntSurv="sideshot">6136906.055079157 273408.4576086007</CgPoint>
    <CgPoint name="2" state="existing" pntSurv="sideshot">6136925.741528804 273420.48251537286</CgPoint>
    <CgPoint name="3" state="existing" pntSurv="sideshot">6136808.228580002 273405.68542503234</CgPoint>
    <CgPoint name="4" state="existing" pntSurv="sideshot">6136829.347486079 273418.75266889523</CgPoint>
    <CgPoint name="5" state="existing" pntSurv="sideshot">6136815.547231382 273413.79343703896</CgPoint>
    <CgPoint name="6" state="existing" pntSurv="sideshot">6136844.09201983 273417.0205852011</CgPoint>
    <CgPoint name="7" state="existing" pntSurv="sideshot">6136908.805269656 273417.08891974454</CgPoint>
    <CgPoint name="8" state="existing" pntSurv="sideshot">6136854.2168231895 273427.7277531914</CgPoint>
    <CgPoint name="9" state="existing" pntSurv="sideshot">6136870.338415384 273422.2657503052</CgPoint>
    <CgPoint name="10" state="existing" pntSurv="sideshot">6136881.204137031 273421.54921511805</CgPoint>
    <CgPoint name="11" state="existing" pntSurv="sideshot">6136911.336969896 273427.4783740017</CgPoint>
    <CgPoint name="12" state="existing" pntSurv="sideshot">6136863.095254208 273434.3761712413</CgPoint>
    <CgPoint name="13" state="existing" pntSurv="sideshot">6136838.764923053 273430.0754485846</CgPoint>
    <CgPoint name="14" state="existing" pntSurv="sideshot">6136883.117637095 273434.73908850655</CgPoint>
    <CgPoint name="15" state="existing" pntSurv="sideshot">6136872.198768076 273435.71983753773</CgPoint>
  </CgPoints>
  ▼<Parcels>
    ▼<Parcel name="480" state="proposed" parcelType="Single" parcelFormat="Standard" area="216" class="Lot">
      <Center pntRef="SS-1"/>
      ▼<CoordGeom name="P0-1">
        ▼<Line>
          <Start pntRef="42"/>
          <End pntRef="89"/>
        </Line>
        ▼<Line>
          <Start pntRef="89"/>
          <End pntRef="64"/>
        </Line>
        ▼<Line>
          <Start pntRef="64"/>
          <End pntRef="63"/>
        </Line>
        ▼<Line>
          <Start pntRef="63"/>
          <End pntRef="62"/>
        </Line>
        ▼<Line>
          <Start pntRef="62"/>
          <End pntRef="107"/>
        </Line>
      </CoordGeom>
    </Parcel>
  </Parcels>

```

cCogo – Survey Plan Capture

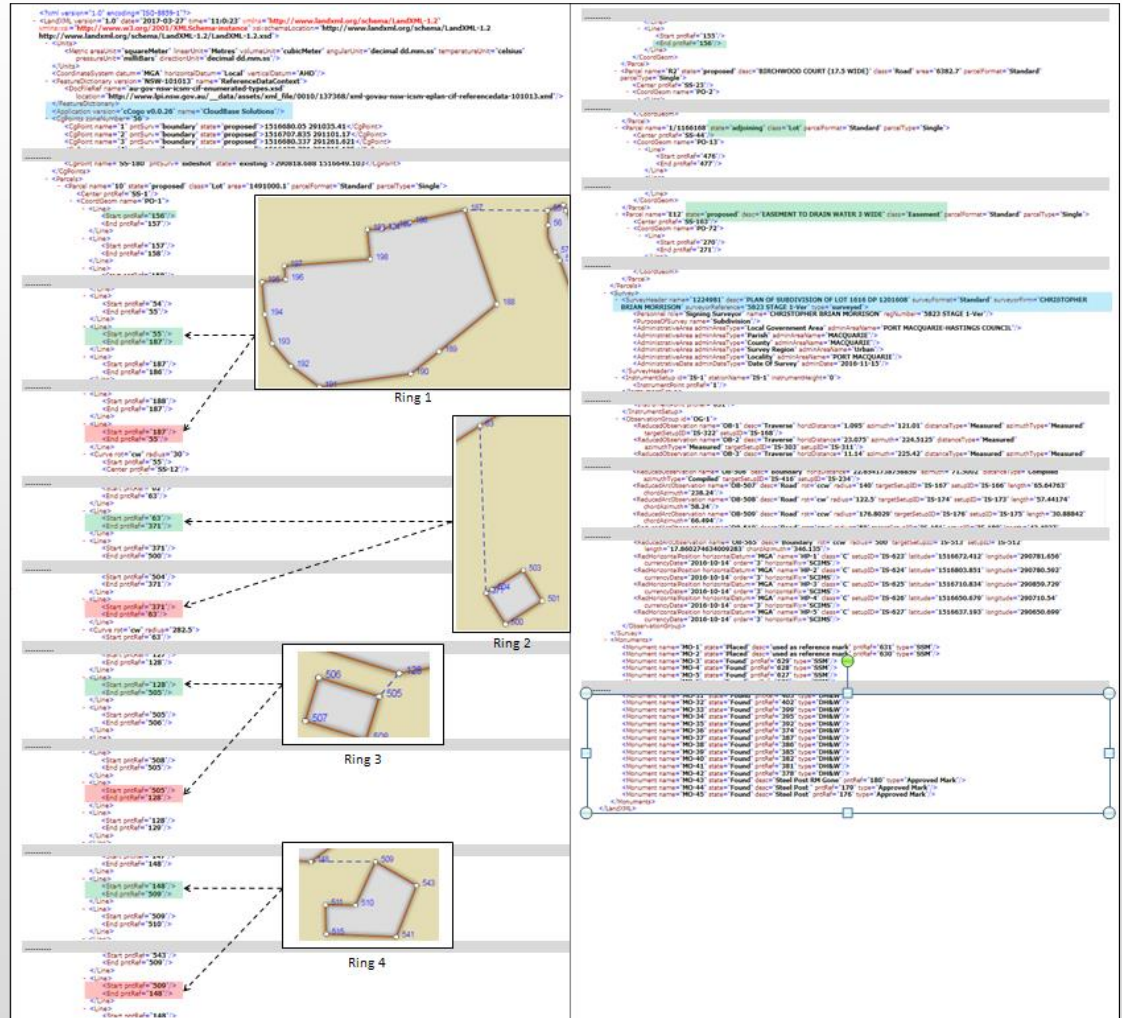
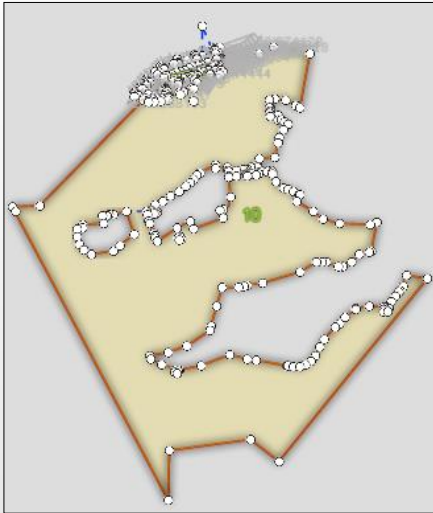
Job	Meta	Extra	Control Marks	Ref Marks	Curves/Shortlines	Page Setup	Cogo Data	Parcels	Easements	Monuments							
No	Group	Line Type	R	Bearing	Distance	Arc Type	Arc Dir	ArcPar 1	ArcPar 2	FP	TP	DistType	Distance (m)	Status	QA Status	State	Surveyors
44	3	Boundary		325 37 45	12.730	Radius&Arc	CW	9.000	14.135	37	38	Calculated	12.730	Closed	Proposed		
45	3	Reference		100 37 45	3.720	Line				38	154	Calculated	3.720	Closed	Proposed	F	
46	3	Boundary		010 37 45	33.265	Line				38	39	Calculated	33.265	Closed	Proposed		
47	3	Reference		100 37 45	3.740	Line				39	155	Calculated	3.740	Closed	Proposed	E	
48	3	Boundary		055 37 45	4.246	Line				39	7	Calculated	4.246	Closed	0.000,0.001	Proposed	
49	4	Boundary		010 37 45	40.150	Line				22	26	Calculated	40.150	Open	Proposed		
50	5	Boundary		010 37 45	40.135	Line				21	27	Calculated	40.135	Open	Proposed		
51	6	Boundary		010 37 45	35.870	Line				20	29	Calculated	35.870	Open	Proposed		
52	7	Boundary		001 38 25	31.990	Line				19	31	Calculated	31.990	Open	Proposed		
53	8	Boundary		254 05 15	16.900	Line				15	32	Calculated	16.900	Open	Proposed		

Page	Curve Id	Bearing	Distance	Radius	Arc Length	Angle	QA Status	Used	Copy
1	1	145 37 45	12.730	9.000	14.135			✓	+
1	2	107 56 30	3.435	13.500	3.445			✓	+
1	3	145 50 25	13.740	13.500	14.415			✓	+
1	4	207 20 35	13.870	13.500	14.570			✓	+
1	5	286 15 10	20.060	13.500	22.615			✓	+
1	6	328 46 35	3.050	16.000	3.055			✓	+
1	7	301 58 10	11.645	16.000	11.920			✓	+
1	8	325 37 45	33.940	24.000	37.700			✓	+
1	8a	287 25 55	5.685	24.000	5.700			✓	+

Job	Meta	Extra	Control Marks	Ref Marks	Curves/Shortlines	Page Setup	Cogo Data	Parcels	Easements	Monuments								
Id	Class	Format	Lot No	Sec No	Type	Usage	RoadNo	RoadName	RoadType	RoadSuffix	CortAuth	State	Description	EnterArea	CalcArea	ConvArea	QA Sta	11 Items
1	Lot	PartLot	15		Multipart							Proposed		5479.17				Locate
2	Lot	Standard			Single		New	Road			Local Gov.	Proposed		2305.47				Polygonise
3	Lot	Standard	23		Single							Proposed		802.90				Assign lot
4	Lot	Standard	19		Single							Proposed		1109.24				Assign rd
5	Lot	Standard	18		Single							Proposed		1132.00				Zoom to...
6	Lot	Standard	22		Single							Proposed		801.40				
7	Lot	Standard	21		Single							Proposed		738.67				
8	Lot	Standard	17		Single							Proposed		1131.66				
9	Lot	Standard	16		Single							Proposed		604.66				
10	Lot	Standard	20		Single							Proposed		1112.68				
11	Lot	PartLot	15		Multipart							Proposed		1207.01				

Page	Mark Type	Mark No	Easting	Northing	Zone	Class	Order	Fix Me
1	SSM	95366	741762.667	6390219.576	55	C	3	SC
1	SSM	98156	741619.039	6390136.346	55	C	3	SC
1	SSM	98157	741722.983	6390103.395	55	C	3	SC
1	SSM	141516	741487.289	6390325.360	55	C	3	Trav
1	SSM	160902	741587.845	6390241.327	55	U	U	Trav
1	SSM	160903	741673.688	6390213.311	55	U	U	Trav
1	SSM	168718	741596.055	6390303.204	55	U	U	Traverse

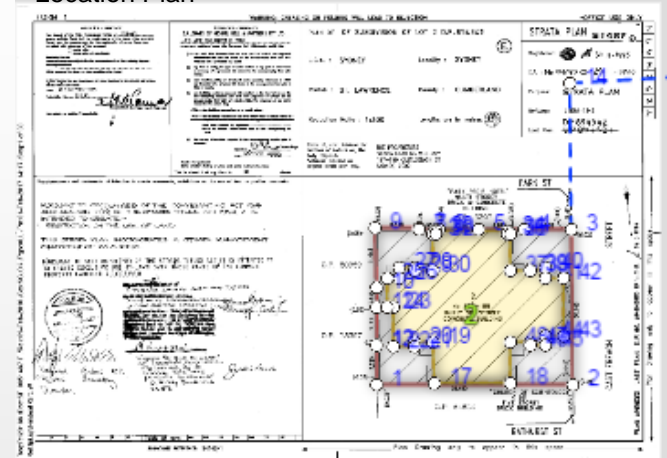
LandXML Export



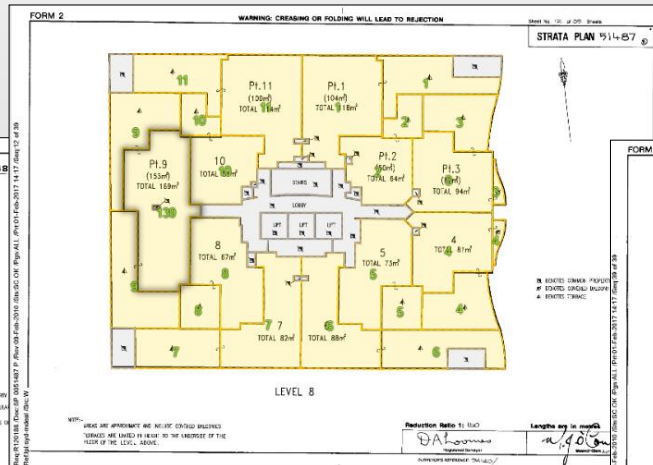
cStrata – Strata Plan Capture



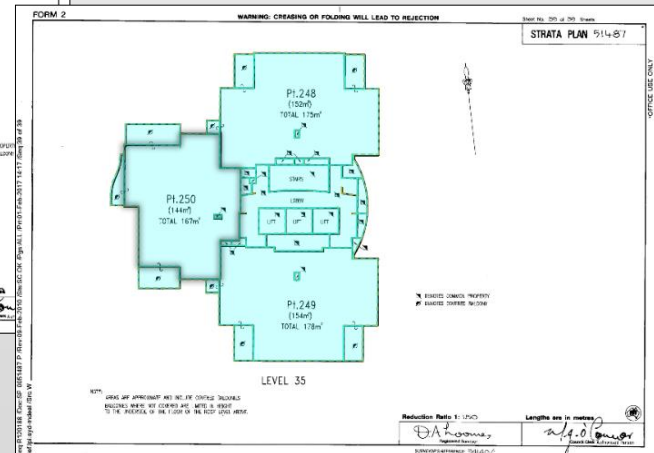
Location Plan



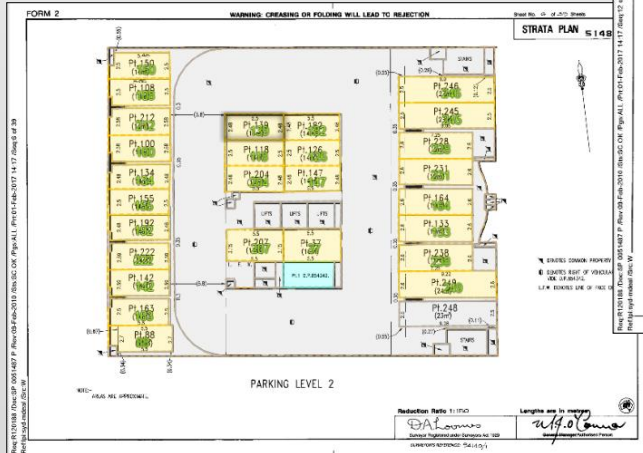
Level 8 Floor Plan



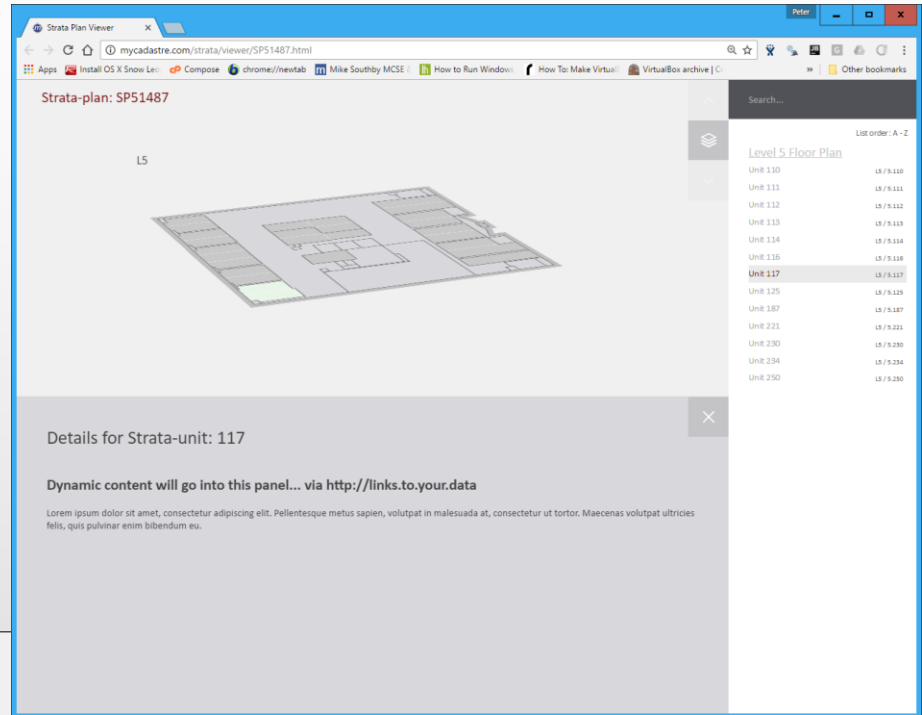
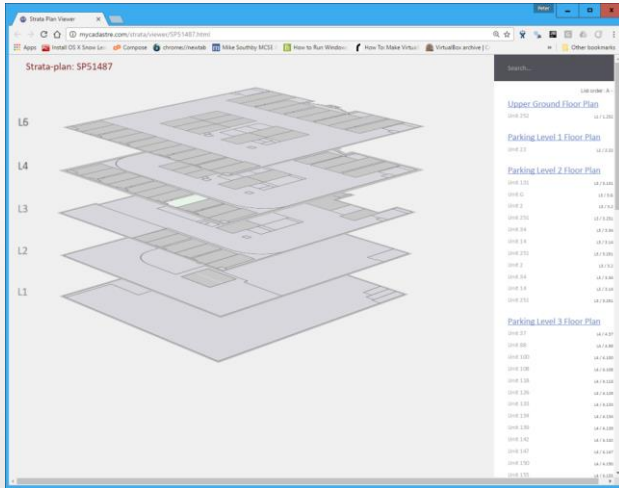
Level 35 Floor Plan



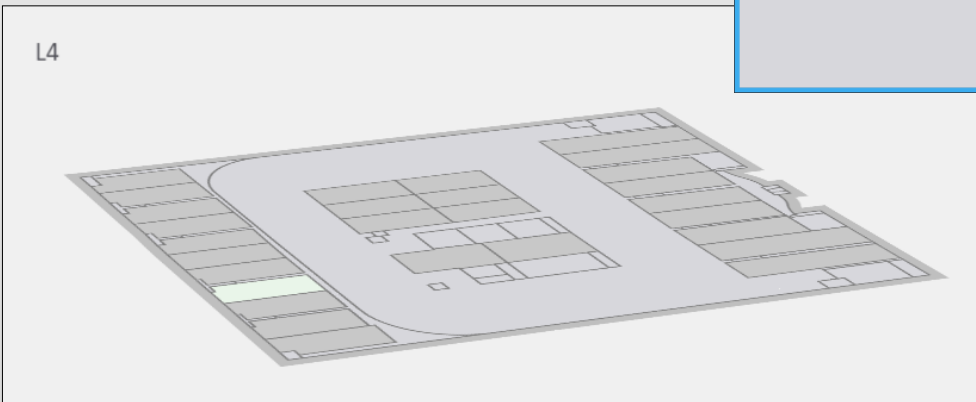
Parking Level 2 Floor Plan



QA and Perspectives

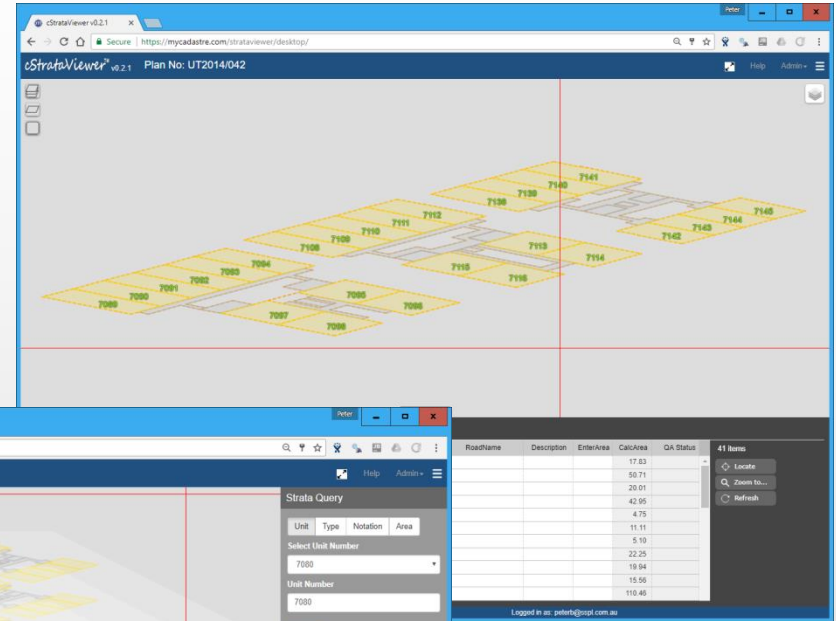
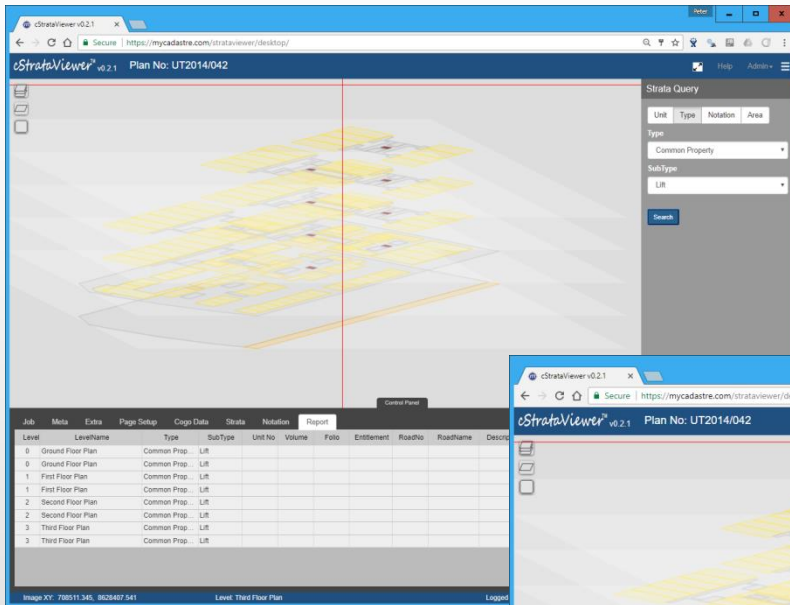


Parking Level 2 Floor Plan



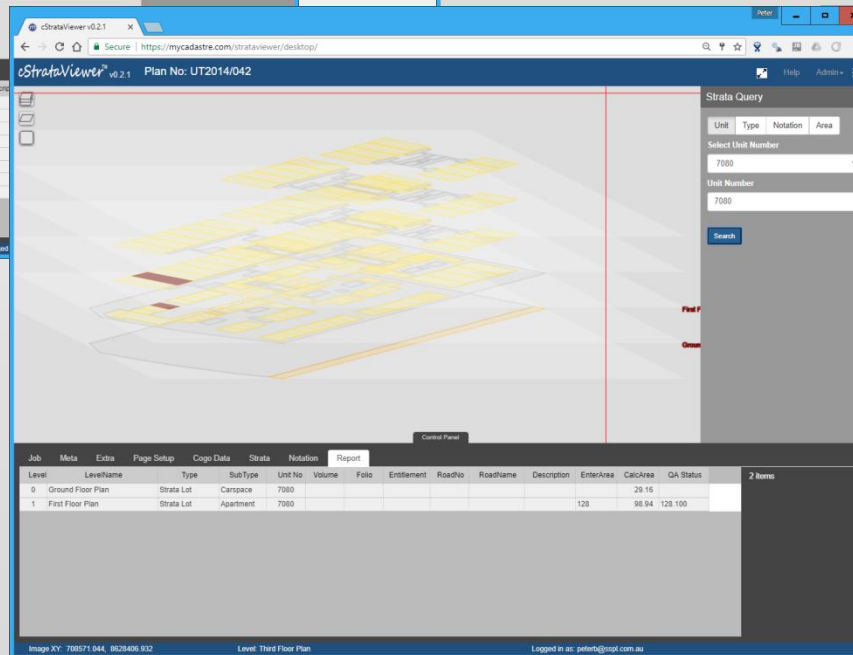
Lightweight Html/CSS version

QA and Perspectives

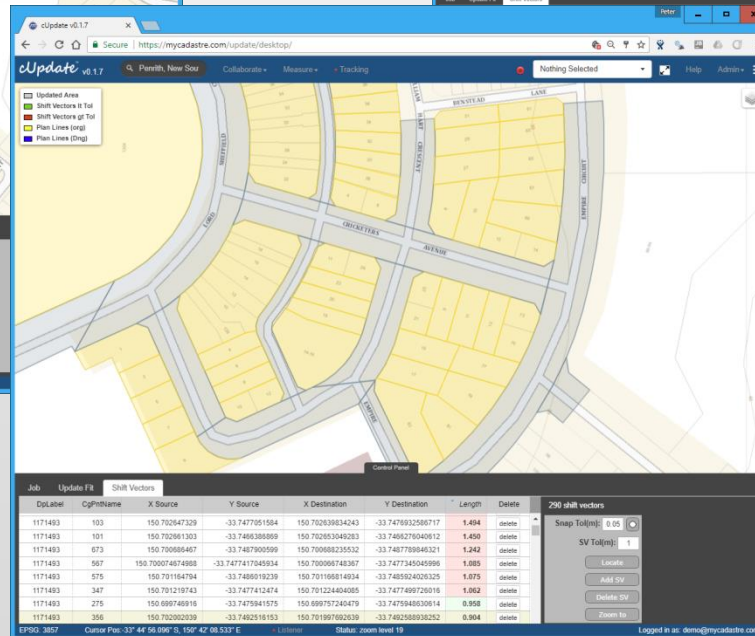
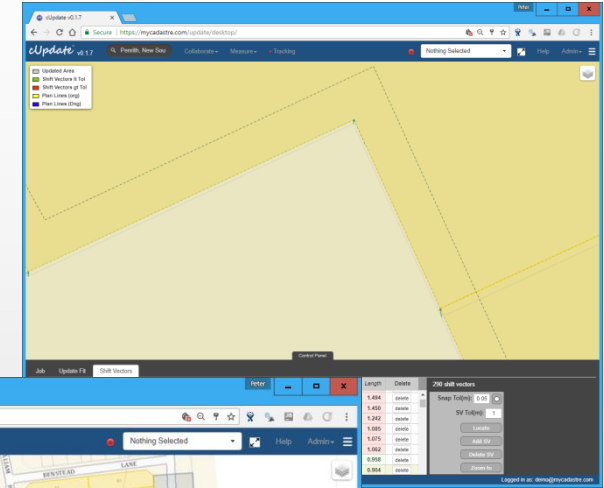
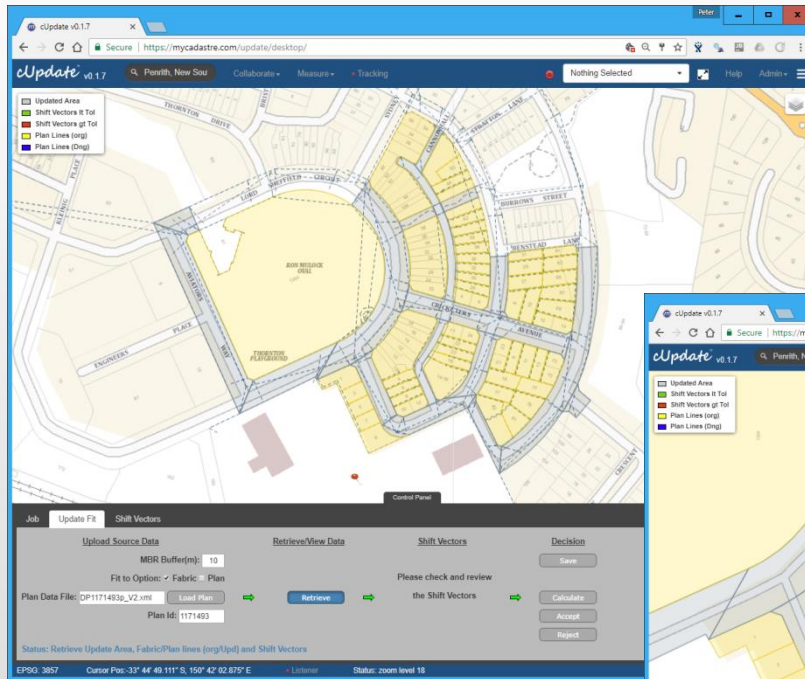


Perspective view queries can identify common elements eg. lifts, stairs, balconies etc.

Use perspective to check attribution – unit numbers, areas etc

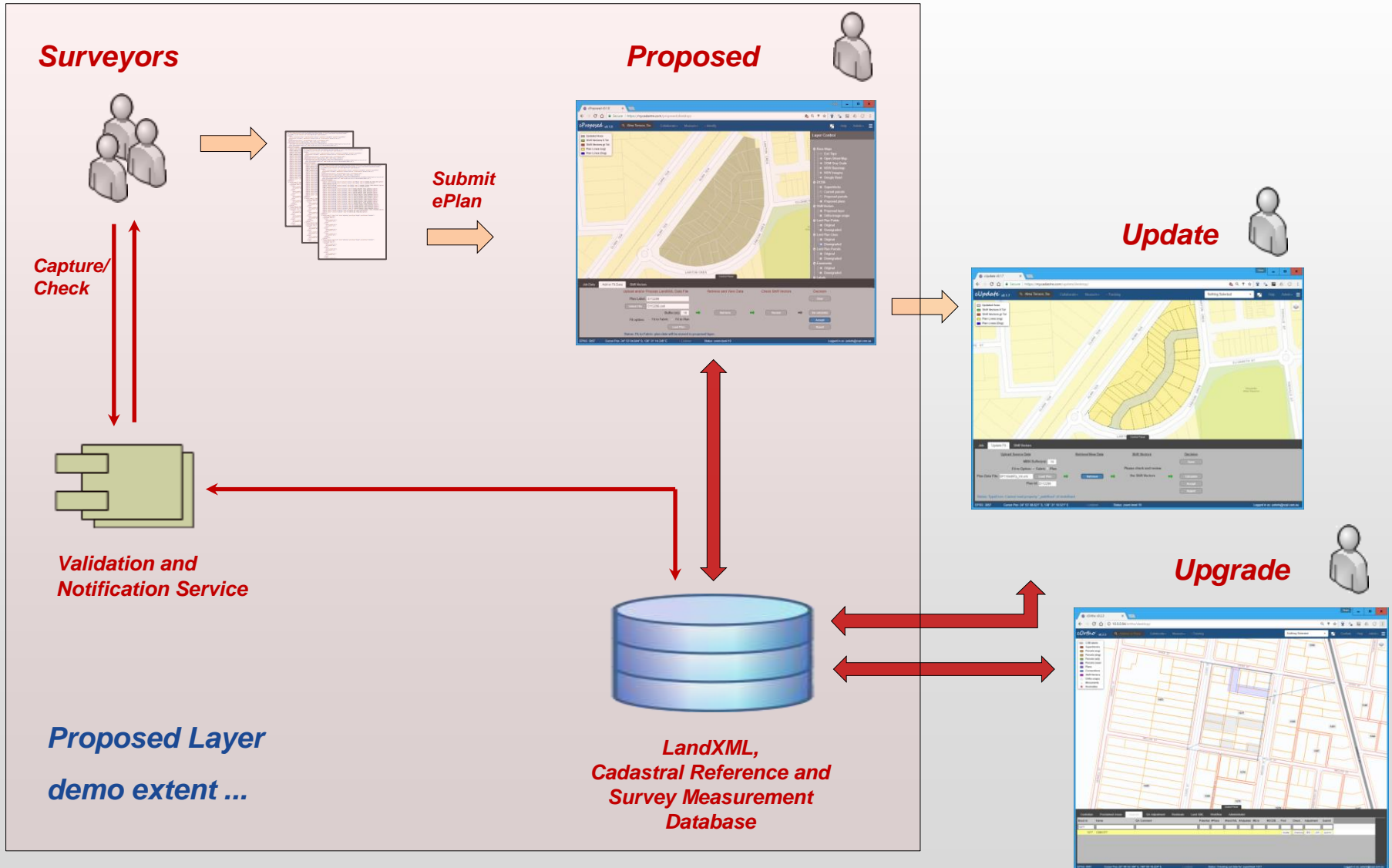


Update – Fit to Fabric



1. LandXML loaded
2. Shift-vectors generated
3. Adjustment performed
4. Shift-vectors examined
5. Re-adjust if necessary
6. Job done!

Planning Layer Workflow



The screenshot shows the myCadastr.com web application interface. The browser address bar displays the URL <https://mycadastr.com/proposed/desktop/>. The application title is "cProposed v0.1.8". The main map area shows a street grid with labels for BYLONG VALLEY WAY, CROWN ST, ILFORD RD, ANGUS AVE, DAVIES RD, WHITE CRES, JACQUES ST, and DANBAR ST. A legend on the left lists map features: Updated Area (grey), Shift Vectors It Tol (green), Shift Vectors gt Tol (red), Plan Lines (org) (yellow), and Plan Lines (Dng) (blue). A dialog box titled "Load available Jobs" is open in the center, displaying the message: "No jobs found. You will need to upload some LandXML first." with an "Ok" button. The bottom of the interface features a "Control Panel" with tabs for "Job Data", "Add or Fit Data", and "Shift Vectors". The "Job Data" tab is active, showing a table with columns: Job No, Plan Label, Version, Description, Status, Comment, Last Updated By, Last Updated, Created, Find, and Update. The table is currently empty. A "Refresh Data" button is located to the right of the table. The status bar at the bottom indicates "EPSG: 3857", "Cursor Pos: waiting...", "Listener", "Status: connected", and "Logged in as: peterb@sspl.com.au".

Load available Jobs

No jobs found.
You will need to upload some LandXML first.

Ok

Job No	Plan Label	Version	Description	Status	Comment	Last Updated By	Last Updated	Created	Find	Update
--------	------------	---------	-------------	--------	---------	-----------------	--------------	---------	------	--------

myCadastr.com v0.1.8

Secure <https://mycadastr.com/proposed/desktop/>

Alma Terrace, Sei Collaborate Measure Identify Help Admin

Legend:

- Updated Area
- Shift Vectors lt Tol
- Shift Vectors gt Tol
- Plan Lines (org)
- Plan Lines (Dng)

Map Labels: CLARK TER, ALMA TER, LAWTON CRES, TODVILLE ST, ELIZABETH ST, Woodliffe West Reserve

Control Panel:

Job Data | **Add or Fit Data** | Shift Vectors

Upload and/or Process LandXML Data File Retrieve and View Data Check Shift Vectors Decision

Plan Label:

Select File...

Fit option: ☐ Fit to Fabric ☐ Fit to Plan

Status:

EPSG: 3857 Cursor Pos:-34° 53' 04.559" S, 138° 31' 13.602" E Listener Status: zoom level 19 Logged in as: peterb@spil.com.au

The screenshot displays the myCadastral.com web application interface for creating a proposed layer. An 'Open' file dialog is open, showing the file selection process. The dialog's address bar indicates the path: Data_01 (D:) > MyCadastral > Demo-landXML > sa. The file list shows several XML files, with 'D112296.xml' selected. The file name 'D112296.xml' is entered in the 'File name' field. The background map shows a residential area with streets like SWEENEY TER, ELIZABETH ST, and LAWTON CRES. The bottom panel contains controls for uploading and processing land XML data files.

Open File Dialog:

Name	Date modified	Type
D95023.xml	19/06/2017 8:18 PM	XML File
D112296.xml	19/06/2017 9:34 PM	XML File
D112296-extra.xml	23/07/2017 11:58 ...	XML File
D112641.xml	21/06/2017 7:06 PM	XML File

Bottom Panel Controls:

Job Data | Add or Fit Data | Shift Vectors

Upload and/or Process LandXML Data File

Plan Label:

Select File...

Buffer (m):

Fit option: ☐ Fit to Fabric ☐ Fit to Plan

Load Plan

Retrieve and View Data

Check Shift Vectors

Decision

Clear

Retrieve

Review

Re-calculate

Accept

Reject

Status: Load Plan and Calculate Fit

EPSG: 3857 | Cursor Pos: -34° 53' 02.365" S, 138° 31' 11.197" E | Listener | Status: zoom level 18 | Logged in as: peterb@sspl.com.au

The screenshot displays the myCadastr.com web application interface. The browser window shows the URL <https://mycadastr.com/proposed/desktop/>. The application title is "cProposed v0.1.8". The main map area shows a residential area with streets labeled: CLARK TER, ALMA TER, LAWTON CRES, ELIZABETH ST, and TODVILLE ST. A large yellow polygon represents a proposed area. A legend in the top-left corner identifies the map elements: Updated Area (yellow), Shift Vectors lt Tol (green), Shift Vectors gt Tol (red), Plan Lines (org) (yellow), and Plan Lines (Dng) (blue). The bottom control panel has tabs for Job Data, Add or Fit Data, and Shift Vectors. The Add or Fit Data tab is active, showing fields for Plan Label (D112296), a Select File... button, a Buffer (m) input (10), and Fit options (Fit to Fabric, Fit to Plan). The Status bar at the bottom indicates EPSG: 3857, Cursor Pos: -34° 53' 04.757" S, 138° 31' 14.577" E, and Logged in as: peterb@spil.com.au.

Updated Area
Shift Vectors lt Tol
Shift Vectors gt Tol
Plan Lines (org)
Plan Lines (Dng)

CLARK TER
ALMA TER
LAWTON CRES
ELIZABETH ST
TODVILLE ST
Woodville West Reserve

Control Panel

Job Data | Add or Fit Data | Shift Vectors

Upload and/or Process LandXML Data File

Plan Label: D112296
Select File... D112296.xml
Buffer (m): 10
Fit option: ☐ Fit to Fabric ☐ Fit to Plan
Load Plan

Retrieve and View Data

Retrieve

Check Shift Vectors

Review

Decision

Clear
Re-calculate
Accept
Reject

Status: Load Plan and Calculate Fit

EPSG: 3857 | Cursor Pos: -34° 53' 04.757" S, 138° 31' 14.577" E | Listener | Status: zoom level 19 | Logged in as: peterb@spil.com.au

cProposed v0.1.8

Secure | <https://mycadastral.com/proposed/desktop/>

cProposed v0.1.8 | Alma Terrace, Sei | Collaborate | Measure | Identify | Help | Admin

Legend:

- Updated Area
- Shift Vectors It Tol
- Shift Vectors gt Tol
- Plan Lines (org)
- Plan Lines (Dng)

Layer Control

- Base Maps
 - Esri Topo
 - Open Street Map
 - OSM Gray Scale
 - NSW Basemap
 - NSW Imagery
 - Google Road
- DCDB
 - Superblocks
 - Current parcels
 - Proposed parcels
 - Proposed plans
- Shift Vectors
 - Proposed layer
 - Ortho-image snaps
- Lxml Plan Points
 - Original
 - Downgraded
- Lxml Plan Lines
 - Original
 - Downgraded
- Lxml Plan Parcels
 - Original
 - Downgraded
- Easements
 - Original
 - Downgraded
- Labels

Job Data | Add or Fit Data | Shift Vectors

Upload and/or Process LandXML Data File | Retrieve and View Data | Check Shift Vectors | Decision

Plan Label:

Select File...

Buffer (m):

Fit option: ☐ Fit to Fabric ☐ Fit to Plan

Status: Retrieve update area, fabric/plan lines (org/upd) and shift-vectors

EPSG: 3857 | Cursor Pos:-34° 53' 04.749" S, 138° 31' 19.733" E | Listener | Status: zoom level 19 | Logged in as: peterb@sspl.com.au

Browser: cProposed v0.1.8
URL: https://mycadastral.com/proposed/desktop/

Search: Alma Terrace, Se...
Buttons: Collaborate, Measure, Identify, Help, Admin

Legend:

- Updated Area
- Shift Vectors It Tol
- Shift Vectors gt Tol
- Plan Lines (org)
- Plan Lines (Dng)

Layer Control:

- Base Maps
 - Esri Topo
 - Open Street Map
 - OSM Grey Scale
 - NSW Basemap
 - NSW Imagery
 - Google Road
- DCDB
 - Superblocks
 - Current parcels
 - Proposed parcels
 - Proposed plans
- Shift Vectors
 - Proposed layer
 - Ortho-image snaps
- Lxml Plan Points
 - Original
 - Downgraded
- Lxml Plan Lines
 - Original
 - Downgraded
- Lxml Plan Parcels
 - Original
 - Downgraded
- Easements
 - Original
 - Downgraded
- Labels

Control Panel

Job Data | Add or Fit Data | **Shift Vectors**

Plan Label	CgPnt Name	X Source	Y Source	X Destination	Y Destination	Length	Delete
D112296	29	138.52049027	-34.88596653	138.520480060577	-34.8859630845768	1.007	delete
D112296	20	138.52090559	-34.88556525	138.520907565943	-34.885567877151	0.958	delete
D112296	33	138.52021853	-34.8860307499999	138.520208958557	-34.8860310226434	0.874	delete
D112296	41	138.51964888	-34.8859242299999	138.519639421511	-34.8859250543063	0.868	delete
D112296	16	138.52095328	-34.88526079	138.520946022433	-34.8852588537532	0.696	delete
D112296	31	138.52034397	-34.8860108299999	138.520339868038	-34.8860084096921	0.461	delete
D112296	3	138.51964175	-34.88585287	138.519625112096	-34.8858500025139	1.551	delete
D112296	8	138.52069925	-34.8847029199999	138.520690316313	-34.8846973071887	1.026	delete

14 shift vectors

Snap Tol(m): 0.5
SV Tol(m): 1

Buttons: Locate, Add SV, Delete SV, Zoom to

EPSON: 3857 | Cursor Pos: -34° 53' 08.553" S, 138° 31' 11.977" E | Listener | Status: zoom level 21 | Logged in as: peterb@spil.com.au

The screenshot displays the myCadastral.com web application interface for creating a proposed layer. The browser window shows the URL <https://mycadastral.com/proposed/desktop/>. The application title is "cProposed v0.1.8".

Map Interface:

- Legend:** Located in the top-left corner, it includes:
 - Updated Area (light yellow)
 - Shift Vectors lt Tol (green line)
 - Shift Vectors gt Tol (red line)
 - Plan Lines (org) (yellow)
 - Plan Lines (Dng) (blue)
- Map:** The central area shows a map with yellow parcels and blue lines representing proposed plan lines. A control panel is visible at the bottom of the map area.
- Layer Control:** Located on the right side, it lists various layers:
 - Base Maps:** Esri Topo, Open Street Map, OSM Grey Scale, NSW Basemap, NSW Imagery, Google Road.
 - DCDB:** Superblocks, Current parcels, Proposed parcels, Proposed plans.
 - Shift Vectors:** Proposed layer, Ortho-image snaps.
 - Lxml Plan Points:** Original, Downgraded.
 - Lxml Plan Lines:** Original, Downgraded.
 - Lxml Plan Parcels:** Original, Downgraded.
 - Easements:** Original, Downgraded.
 - Labels:**

Control Panel:

The control panel is divided into four main sections:

- Job Data:** Includes tabs for "Add or Fit Data" and "Shift Vectors".
- Upload and/or Process LandXML Data File:** Includes a "Plan Label" field (D112296), a "Select File..." button, and a "Buffer (m):" field (10).
- Retrieve and View Data:** Includes a "Retrieve" button.
- Check Shift Vectors:** Includes a "Review" button.
- Decision:** Includes buttons for "Clear", "Re-calculate", "Accept", and "Reject".

Status: Retrieve update area, fabric/plan lines (org/upd) and shift-vectors

Footer: EPSG: 3857, Cursor Pos: -34° 53' 09.842" S, 138° 31' 10.140" E, Listener, Status: zoom level 21, Logged in as: peterb@sspl.com.au

The screenshot displays the myCadastr.com web application interface. The main map area shows a residential street layout with streets labeled CLARK TER, ALMA TER, LAWTON CRES, and ELIZABETH ST. The map features several layers, including updated areas (yellow), shift vectors (green and red), and plan lines (yellow and blue). A legend in the top-left corner identifies these layers: Updated Area, Shift Vectors lt Tol, Shift Vectors gt Tol, Plan Lines (org), and Plan Lines (Dng).

On the right side, a 'Layer Control' panel lists various map layers and their visibility status. The layers include Base Maps (Esri Topo, Open Street Map, OSM Gray Scale, NSW Basemap, NSW Imagery, Google Road), DCDB (Superblocks, Current parcels, Proposed parcels, Proposed plans), Shift Vectors (Proposed layer, Ortho-image snaps), Lxml Plan Points (Original, Downgraded), Lxml Plan Lines (Original, Downgraded), Lxml Plan Parcels (Original, Downgraded), Easements (Original, Downgraded), and Labels.

At the bottom, a 'Control Panel' contains tabs for Job Data, Add or Fit Data, and Shift Vectors. The 'Add or Fit Data' tab is active, showing a workflow for uploading and processing LandXML data files. The workflow includes fields for Plan Label (D112296), a file selection button, Buffer (m) (10), and Fit option (Fit to Fabric, Fit to Plan). The 'Retrieve' button is highlighted in blue. The status bar at the bottom indicates the status: Retrieve update area, fabric/plan lines (org/upd) and shift-vectors.

The status bar at the bottom of the application shows the following information: EPSG: 3857, Cursor Pos: -34° 53' 04.678" S, 138° 31' 15.214" E, Listener, Status: zoom level 19, and Logged in as: peterb@sspl.com.au.

The screenshot displays the myCadastral.com web application interface for creating a proposed layer. The browser window shows the URL <https://mycadastral.com/proposed/desktop/>. The application title is "cProposed v0.1.8".

Map Interface:

- Legend:** Located in the top-left corner, it includes:
 - Updated Area (light green)
 - Shift Vectors lt Tol (dark green)
 - Shift Vectors gt Tol (red)
 - Plan Lines (org) (yellow)
 - Plan Lines (Dng) (blue)
- Map:** A central map showing a street layout with labels for CLARK TER, ALMA TER, LAWTON CRES, and ELIZABETH. A central area is highlighted in light green, indicating the "Updated Area".
- Layer Control:** A panel on the right side of the map, titled "Layer Control", listing various map layers and their status (Original or Downgraded).
 - Base Maps:** Esri Topo, Open Street Map, OSM Grey Scale, NSW Basemap, NSW Imagery, Google Road.
 - DCDB:** Superblocks, Current parcels, Proposed parcels, Proposed plans.
 - Shift Vectors:** Proposed layer, Ortho-image snaps.
 - Lxml Plan Points:** Original, Downgraded.
 - Lxml Plan Lines:** Original, Downgraded.
 - Lxml Plan Parcels:** Original, Downgraded.
 - Easements:** Original, Downgraded.
 - Labels:**

Control Panel:

The Control Panel at the bottom contains several sections:

- Job Data:** Includes tabs for "Add or Fit Data" and "Shift Vectors".
- Upload and/or Process LandXML Data File:** Features a "Plan Label" field (D112296), a "Select File..." button, and a "Buffer (m): 10" input field.
- Retrieve and View Data:** Includes a "Retrieve" button.
- Check Shift Vectors:** Includes a "Review" button.
- Decision:** Includes buttons for "Clear", "Re-calculate", "Accept", and "Reject".

Status: A message at the bottom of the Control Panel states: "Status: Fit-to-Fabric: plan data will be moved to proposed layer."

Footer: The bottom of the application shows technical details: "EPSG: 3857", "Cursor Pos: -34° 53' 04.844\" S, 138° 31' 14.336\" E", "Listener", "Status: zoom level 19", and "Logged in as: peterb@sspl.com.au".

The screenshot displays the myCadastr.com cProposed v0.1.8 web application. The interface includes a browser window with the URL <https://mycadastr.com/proposed/desktop/>. The main map area shows an aerial view of a residential development with proposed land parcels outlined in blue. A legend in the top-left corner identifies the map elements: Updated Area (light blue), Shift Vectors It Tol (green), Shift Vectors gt Tol (red), Plan Lines (org) (yellow), and Plan Lines (Dng) (purple). The control panel at the bottom is divided into four sections: Job Data, Add or Fit Data, Shift Vectors, and Decision. The Job Data section contains fields for Plan Label (1184497) and a file selection button. The Add or Fit Data section has a Buffer (m) field set to 10 and a Fit option section with radio buttons for Fit to Fabric (selected) and Fit to Plan. The Shift Vectors section includes a Retrieve button. The Decision section contains buttons for Clear, Re-calculate, Accept, and Reject. The status bar at the bottom indicates the EPSG: 3857 projection, cursor coordinates, and the user is logged in as peterb@sspl.com.au.

Legend:

- Updated Area
- Shift Vectors It Tol
- Shift Vectors gt Tol
- Plan Lines (org)
- Plan Lines (Dng)

Control Panel:

Job Data | Add or Fit Data | Shift Vectors

Upload and/or Process LandXML Data File

Plan Label: 1184497

Select File... DP1184497p_V4.xml

Buffer (m): 10

Fit option: ☒ Fit to Fabric ☐ Fit to Plan

Load Plan

Retrieve and View Data

Retrieve

Check Shift Vectors

Review

Decision

Clear

Re-calculate

Accept

Reject

Status: Fit-to-Fabric: plan data will be moved to proposed layer.

EPSG: 3857 | Cursor Pos: -33° 44' 40.038" S, 150° 41' 54.764" E | Listener | Status: zoom level 18 | Logged in as: peterb@sspl.com.au

The screenshot shows the myCadastr.com web application interface for 'Proposed Layer Creation'. The browser window displays the URL <https://mycadastr.com/proposed/desktop/>. The application title is 'cProposed v0.1.8'. The top navigation bar includes a search bar with 'Alma Terrace, Sei', and buttons for 'Collaborate', 'Measure', and 'Identify'. The right sidebar has 'Help' and 'Admin' links.

The main map area shows an aerial view of a residential area with overlaid parcel boundaries. A legend in the top-left corner identifies the following layers:

- Updated Area
- Shift Vectors lt Tol
- Shift Vectors gt Tol
- Plan Lines (org)
- Plan Lines (Dng)

The right sidebar contains a 'Layer Control' panel with the following sections:

- Base Maps:** Esri Topo, Open Street Map, OSM Grey Scale, NSW Basemap, NSW Imagery, Google Road.
- DCDB:** Superblocks, Current parcels, Proposed parcels, Proposed plans.
- Shift Vectors:** Proposed layer, Ortho-image snaps.
- Lxml Plan Points:** Original, Downgraded.
- Lxml Plan Lines:** Original, Downgraded.
- Lxml Plan Parcels:** Original, Downgraded.
- Easements:** Original, Downgraded.
- Labels:**

The bottom control panel has three tabs: 'Job Data', 'Add or Fit Data', and 'Shift Vectors'. The 'Add or Fit Data' tab is active, showing the following workflow:

- Upload and/or Process LandXML Data File:** Includes a 'Plan Label' field with '1171491', a 'Select File...' button, and a file input field containing 'DP1171491p_V2.xml'. There is also a 'Buffer (m): 10' field and 'Fit option' radio buttons for 'Fit to Fabric' and 'Fit to Plan'. A 'Load Plan' button is at the bottom.
- Retrieve and View Data:** Includes a 'Retrieve' button.
- Check Shift Vectors:** Includes a 'Review' button.
- Decision:** Includes 'Clear', 'Re-calculate', 'Accept', and 'Reject' buttons.

Green arrows indicate the flow from 'Retrieve' to 'Review' to 'Re-calculate'. The status bar at the bottom shows 'Status: Retrieve update area, fabric/plan lines (org/upd) and shift-vectors', 'EPSG: 3857', 'Cursor Pos: -33° 44' 41.821" S, 150° 42' 01.388" E', 'Listener', 'Status: zoom level 17', and 'Logged in as: peterb@spil.com.au'.

myCadastrre.com v0.1.8

Secure | <https://mycadastrre.com/proposed/desktop/>

Alma Terrace, Sei

Collaborate Measure Identify

Help Admin

Layer Control

- Base Maps
 - Esri Topo
 - Open Street Map
 - OSM Grey Scale
 - NSW Basemap
 - NSW Imagery
 - Google Road
- DCDB
 - Superblocks
 - Current parcels
 - Proposed parcels
 - Proposed plans
- Shift Vectors
 - Proposed layer
 - Ortho-image snaps
- Lxml Plan Points
 - Original
 - Downgraded
- Lxml Plan Lines
 - Original
 - Downgraded
- Lxml Plan Parcels
 - Original
 - Downgraded
- Easements
 - Original
 - Downgraded
- Labels

Job Data **Add or Fit Data** **Shift Vectors**

Upload and/or Process LandXML Data File

Plan Label: 1171491

Select File: DP1171491p_V2.xml

Buffer (m): 10

Fit option: ☐ Fit to Fabric ☐ Fit to Plan

Load Plan

Retrieve and View Data

Check Shift Vectors

Decision

Clear

Retrieve Review Re-calculate

Accept Reject

Status: Retrieve update area, fabric/plan lines (org/upd) and shift-vectors

EPSG: 3857 Cursor Pos: 33° 44' 17.090° S, 150° 42' 05.791° E Listener Status: zoom level 15 Logged in as: peterb@sspl.com.au

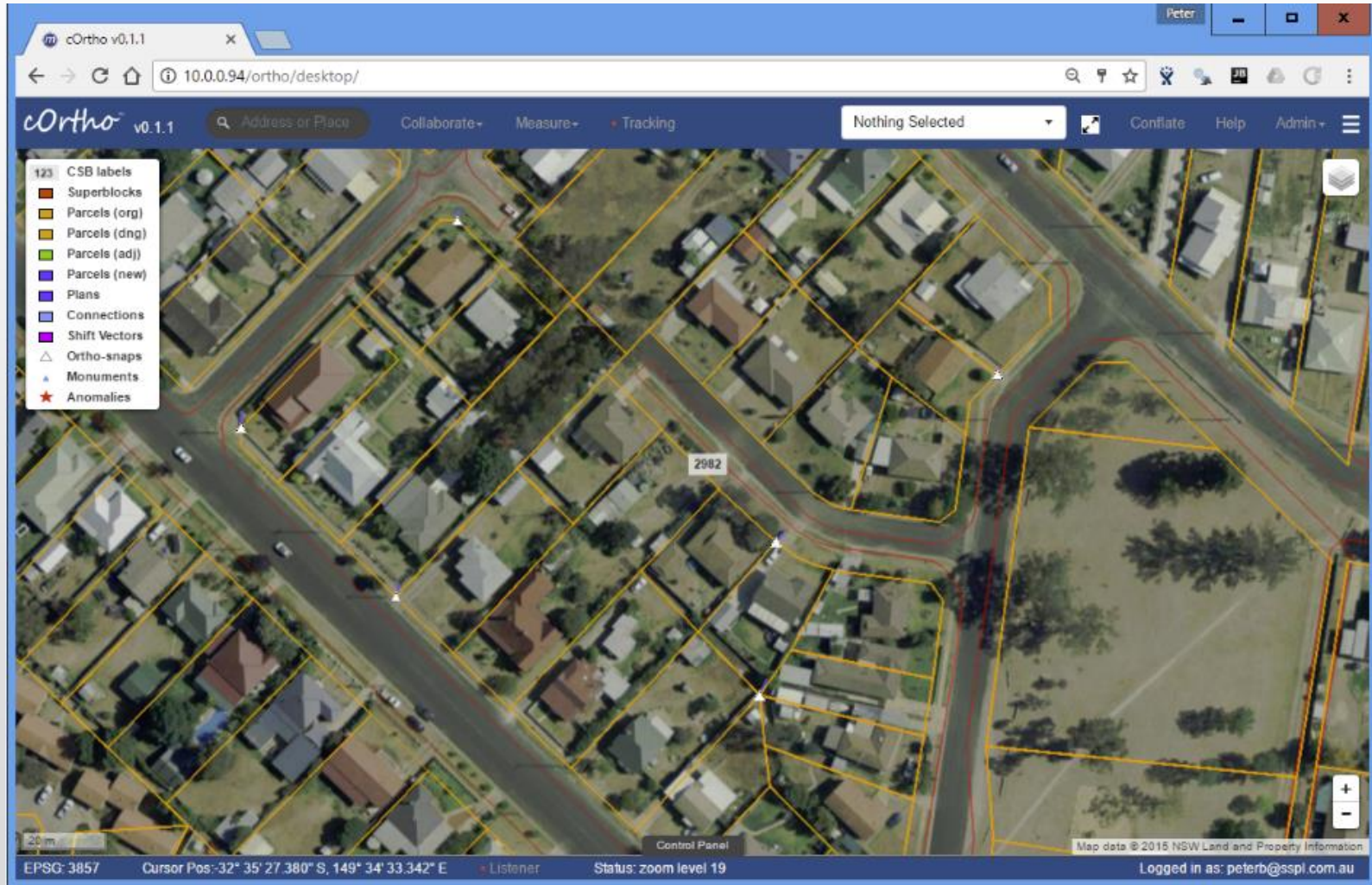
Ortho Upgrade



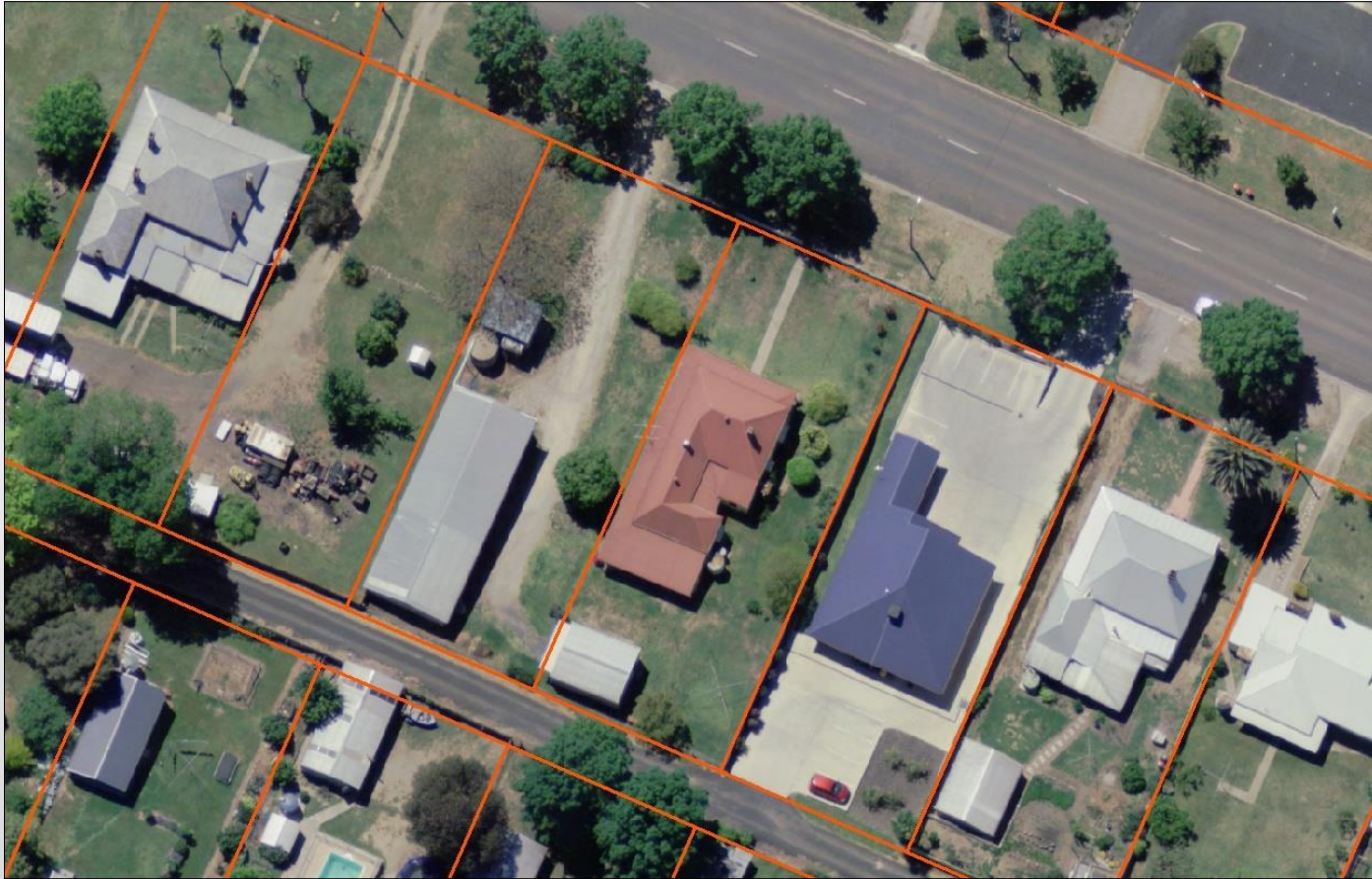
Common situation



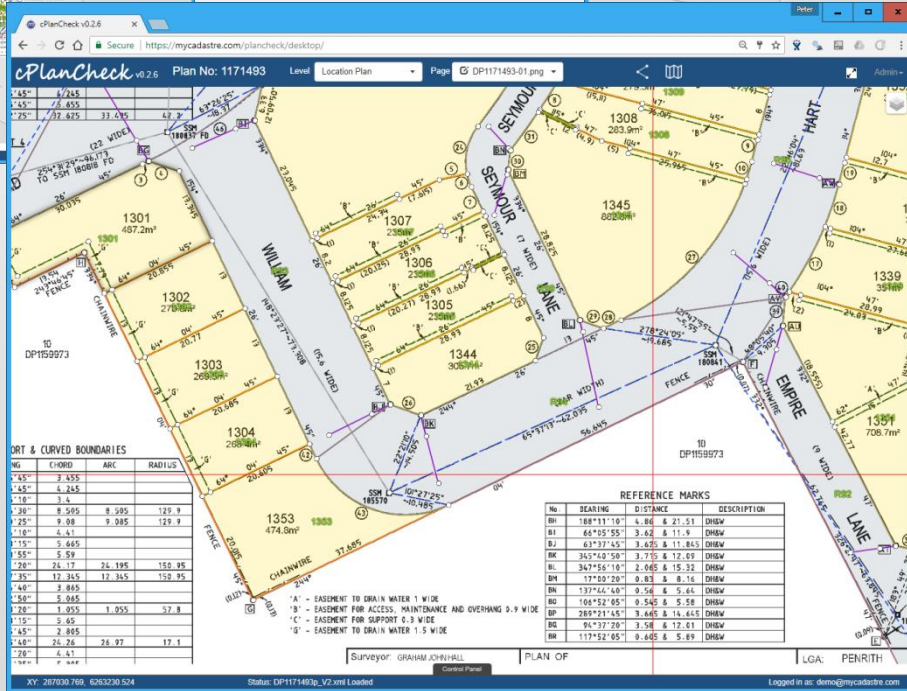
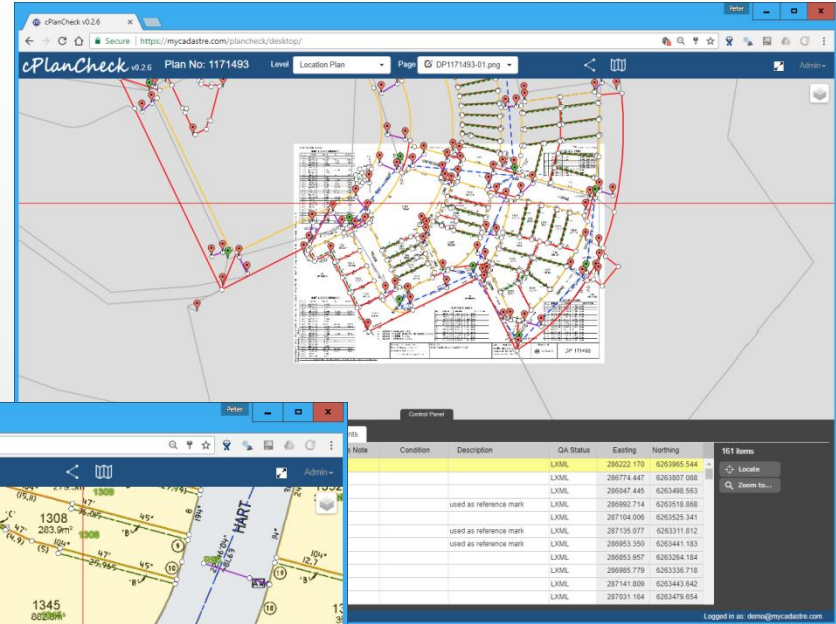
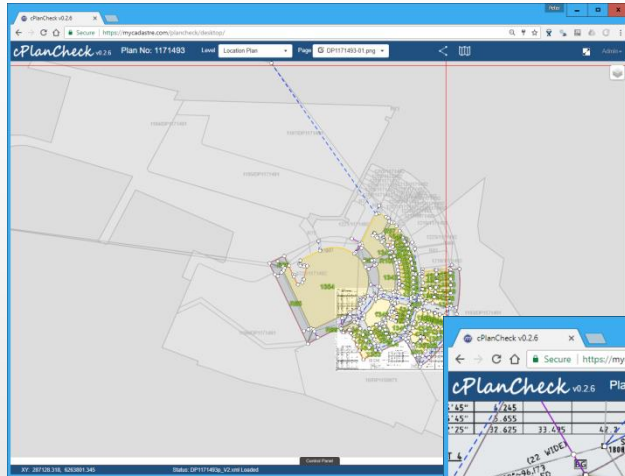
Ortho Upgrade...



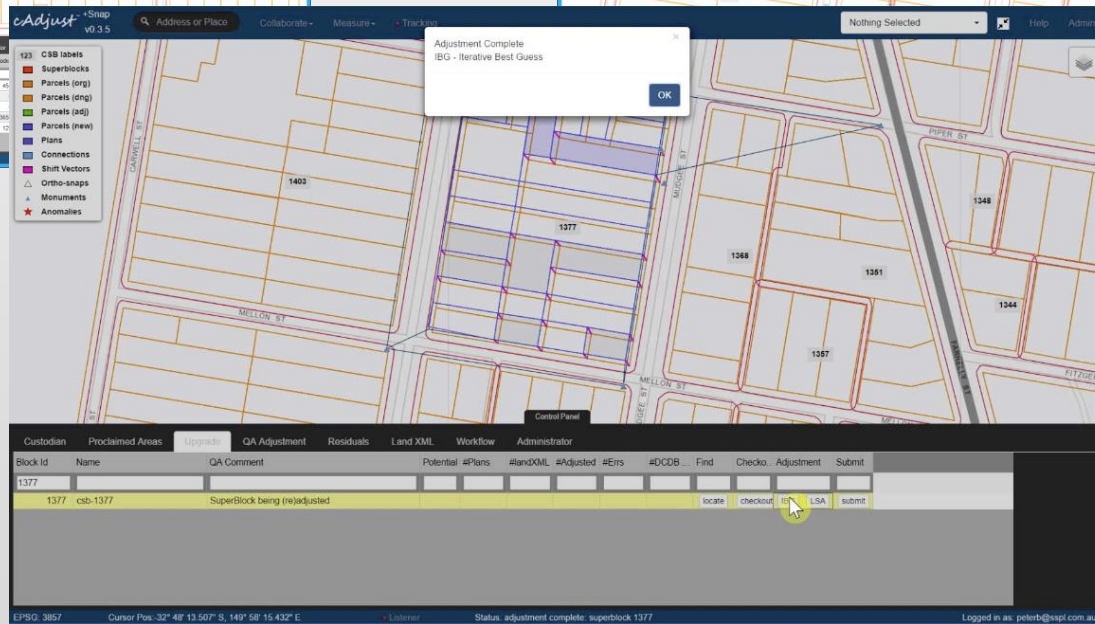
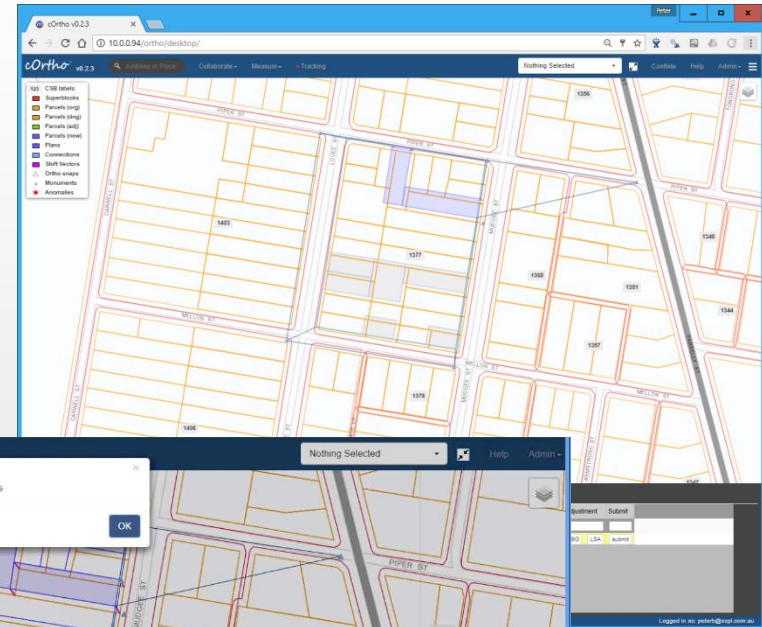
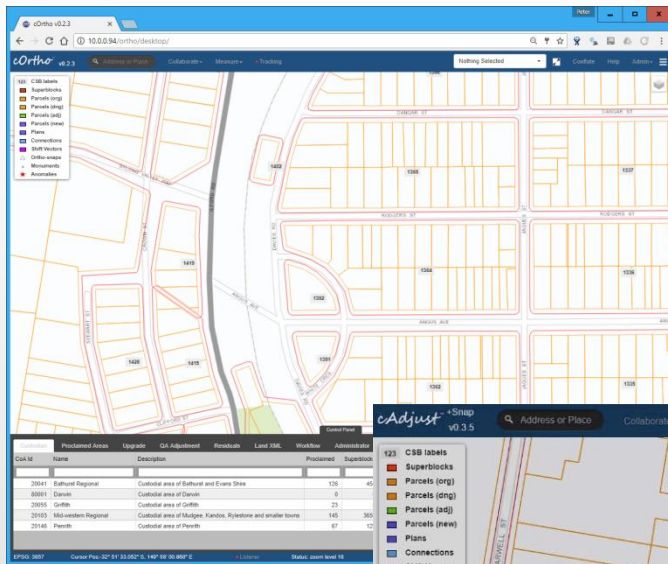
Adjusted



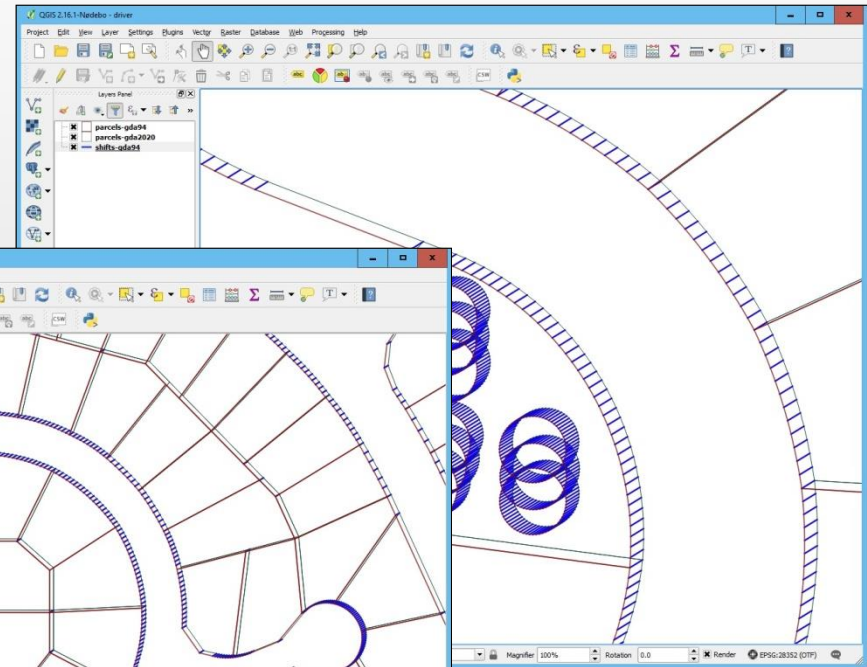
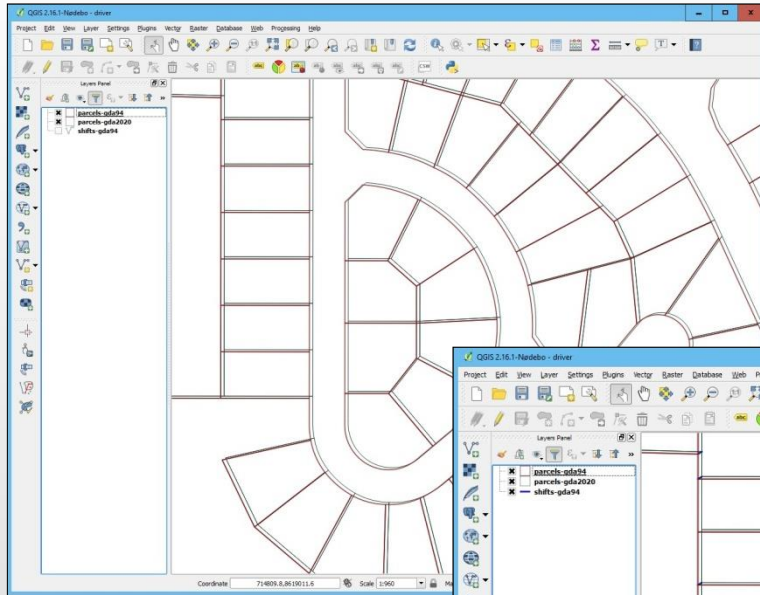
Plan Checking



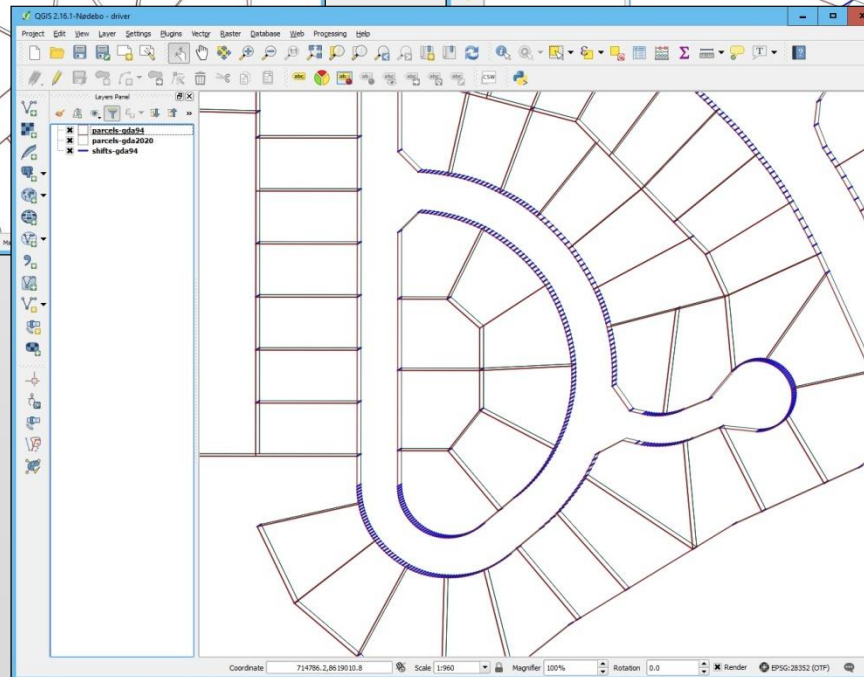
LandXML import/upgrade



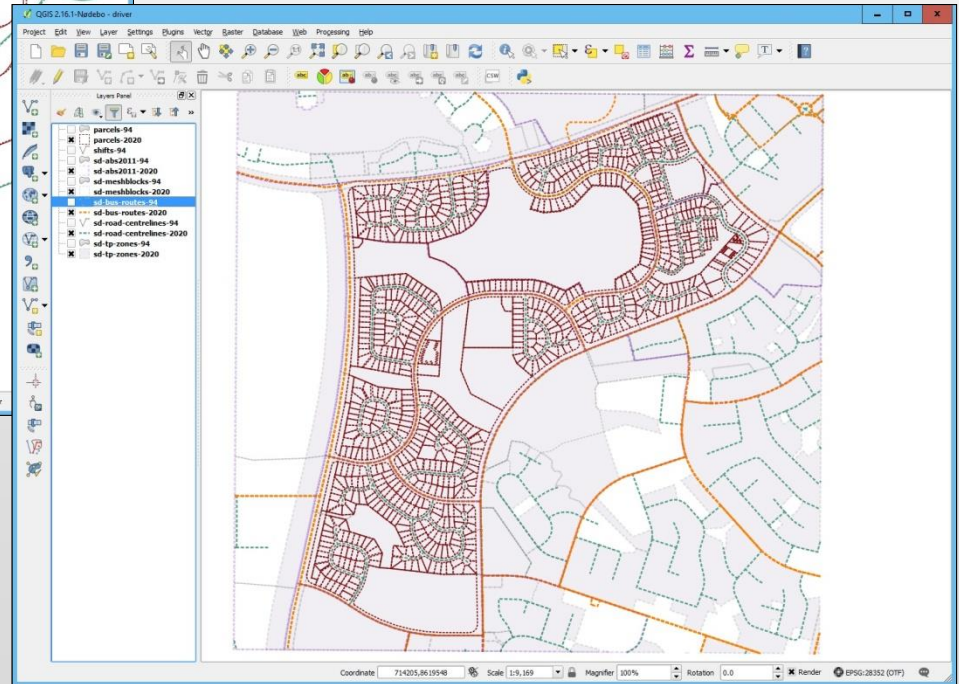
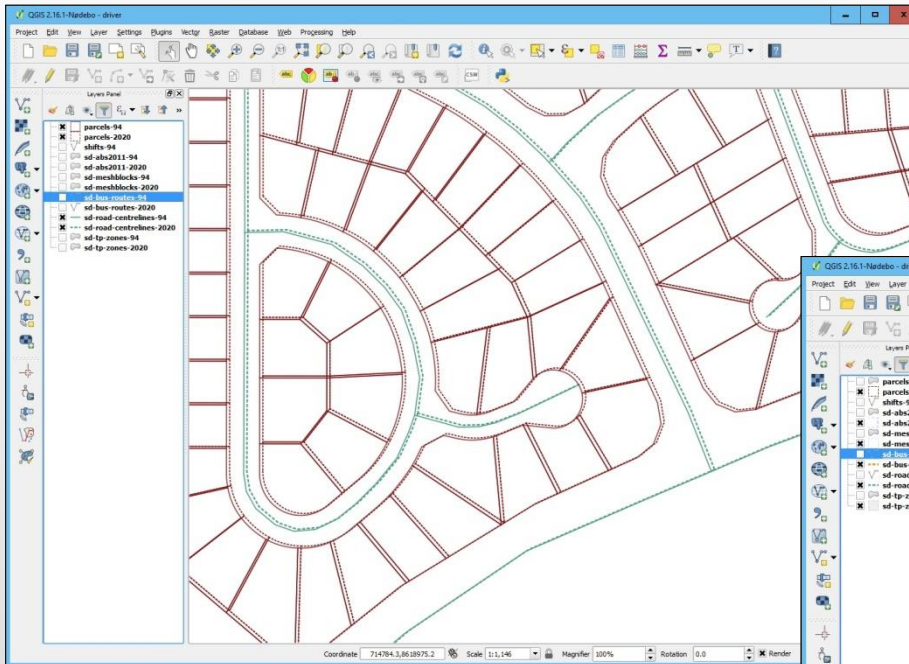
Conflation – harmonise two cadastral datasets



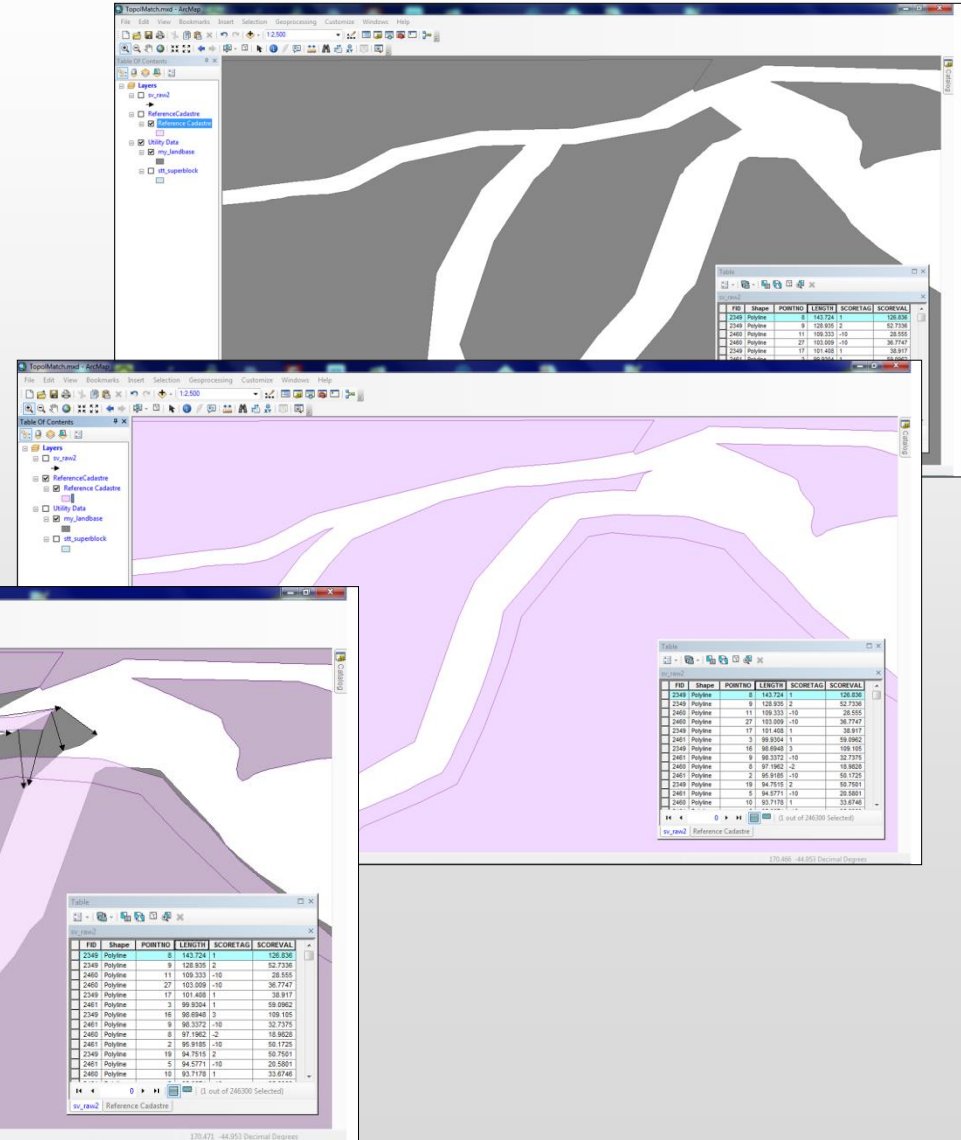
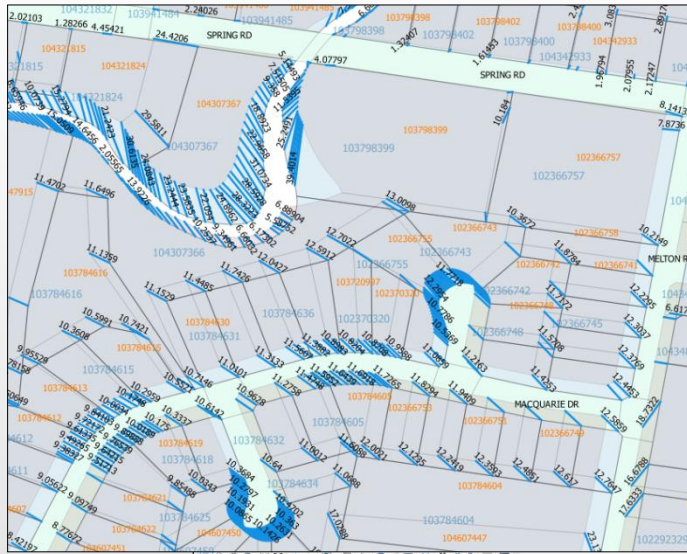
Case Study:
Suburb of Driver



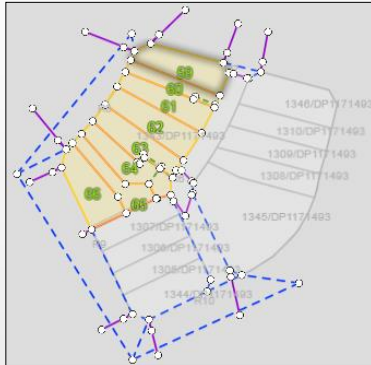
Conflation – process spatially dependent layers



Complex topology matching



LandXML PlanViewer



LandXML PlanViewer displays a detailed XML file structure for a land parcel, including metadata, survey information, and geometric data. The XML is organized into sections for survey data, parcel boundaries, and easements.

Survey Data:

- Survey Name:** PLAN OF SUBDIVISION OF LOT 1343 DP1171493
- Surveyor:** GRHAM JOHN HALL
- Survey Date:** 2013-08-07
- Survey Type:** Standard
- Survey Status:** Proposed

Parcel Information:

- Parcel Name:** 50
- Parcel Area:** 279.51
- Parcel Type:** Standard
- Parcel Status:** Proposed

Boundary Data:

- Boundary Name:** 50-1
- Boundary Type:** Standard
- Boundary Status:** Proposed
- Boundary Length:** 122.8
- Boundary Width:** 122.8

Easement Data:

- Easement Name:** E1
- Easement Type:** Standard
- Easement Status:** Existing
- Easement Length:** 104
- Easement Width:** 104

Survey Points:

- Point Name:** 50-1
- Point Type:** Standard
- Point Status:** Proposed
- Point Coordinates:** 122.8, 122.8

Survey Lines:

- Line Name:** 50-1
- Line Type:** Standard
- Line Status:** Proposed
- Line Coordinates:** 122.8, 122.8

Survey Area:

- Area Name:** 50
- Area Type:** Standard
- Area Status:** Proposed
- Area Coordinates:** 122.8, 122.8

Survey Boundary:

- Boundary Name:** 50-1
- Boundary Type:** Standard
- Boundary Status:** Proposed
- Boundary Coordinates:** 122.8, 122.8

Survey Easement:

- Easement Name:** E1
- Easement Type:** Standard
- Easement Status:** Existing
- Easement Coordinates:** 104, 104

Survey Notes:

- Note Name:** 50
- Note Type:** Standard
- Note Status:** Proposed
- Note Text:** 122.8, 122.8

Survey Metadata:

- Metadata Name:** 50
- Metadata Type:** Standard
- Metadata Status:** Proposed
- Metadata Text:** 122.8, 122.8

Survey Summary:

- Summary Name:** 50
- Summary Type:** Standard
- Summary Status:** Proposed
- Summary Text:** 122.8, 122.8

Survey Footer:

- Footer Name:** 50
- Footer Type:** Standard
- Footer Status:** Proposed
- Footer Text:** 122.8, 122.8

Innovation

The new ideas that become truly influential are a combination of previously proven ideas that in their totality turn into something special.

The genius of innovation is almost never a revolutionary new idea. Most often, innovation is combining a series of previously unrelated items into something that by nature of their combination becomes new and remarkable.

Adam Harrell (Nebo)

In reality → 10% inspiration and 90% perspiration !

Peter Barratt (myCadastre)

Cadastral Processing in the Cloud or behind the Firewall



Done...

thank you

谢谢

terimah kasih

ありがとうございます

salamat po

ขอบคุณครับ