

GDA2020 update

REROC Mapped Out Conference

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GDA2020 key messages

- **GDA2020** - Geocentric Datum of Australia 2020 is the first step in modernising the Australian Geospatial Reference System (AGRS)
- **Standards and software** are falling into place to support AGRS
- **DCS Spatial Collaboration Portal** now delivers GDA94 & GDA2020
- **DCS webservice and incremental feed** updates are expected mid-2021
- Beware “WGS 84”, “Web-Mercator” ... but changes to standards are helping
Prepare to encounter WGS 84 \approx GDA2020

Position in the palm of your hand...

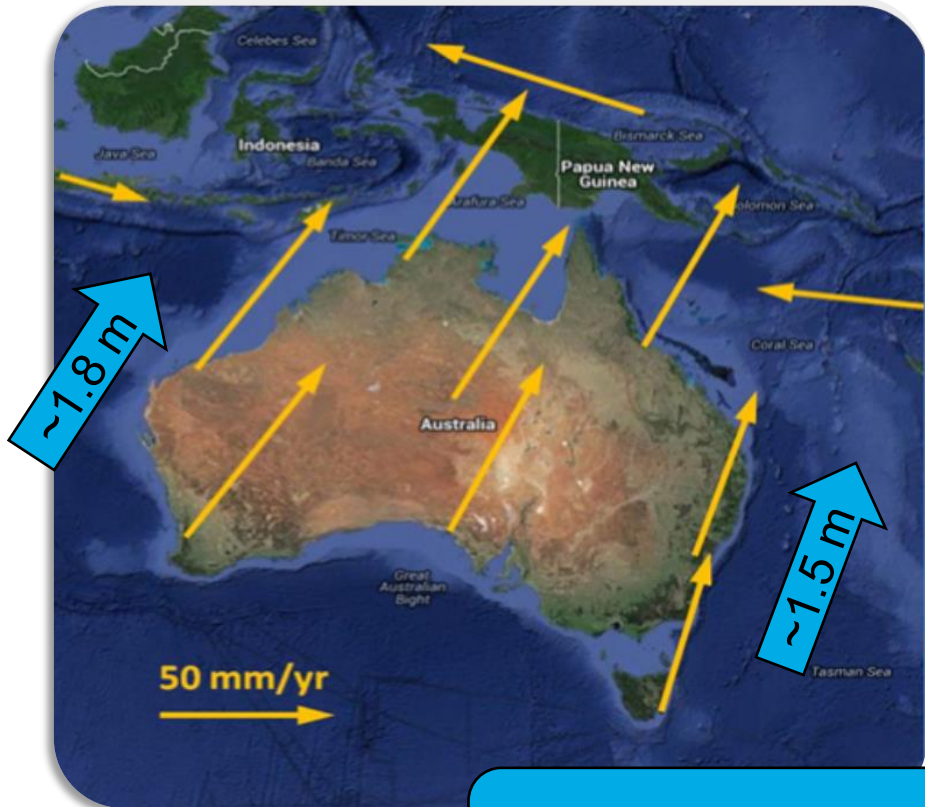


10 cm positioning
‘Anytime, Anywhere’
(3 cm in mobile phone range)



Why update the Australian Datum?

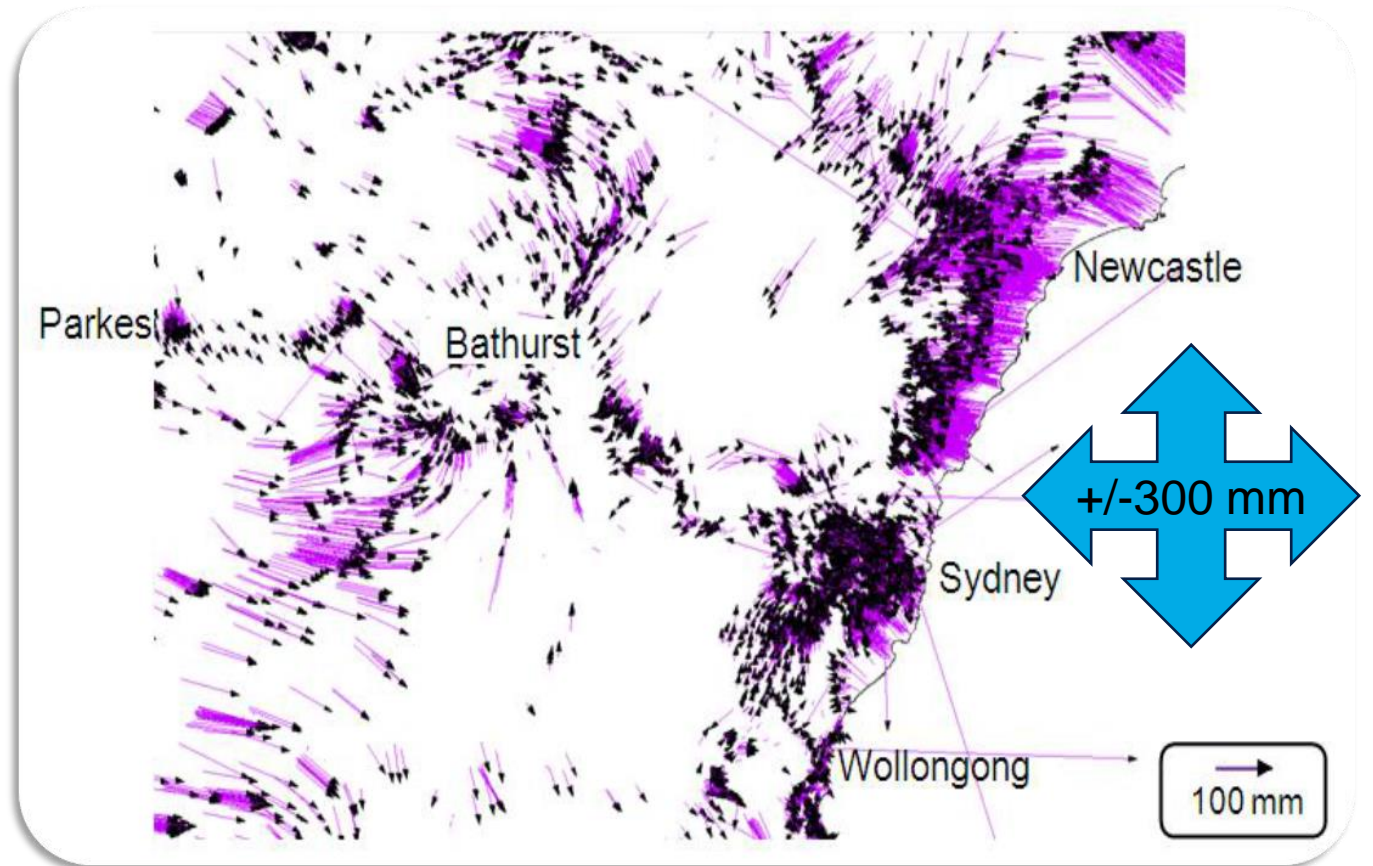
Australia is on the move



Australian Plate Motion Model (PMM)



Known Distortions in the previous datum, GDA94



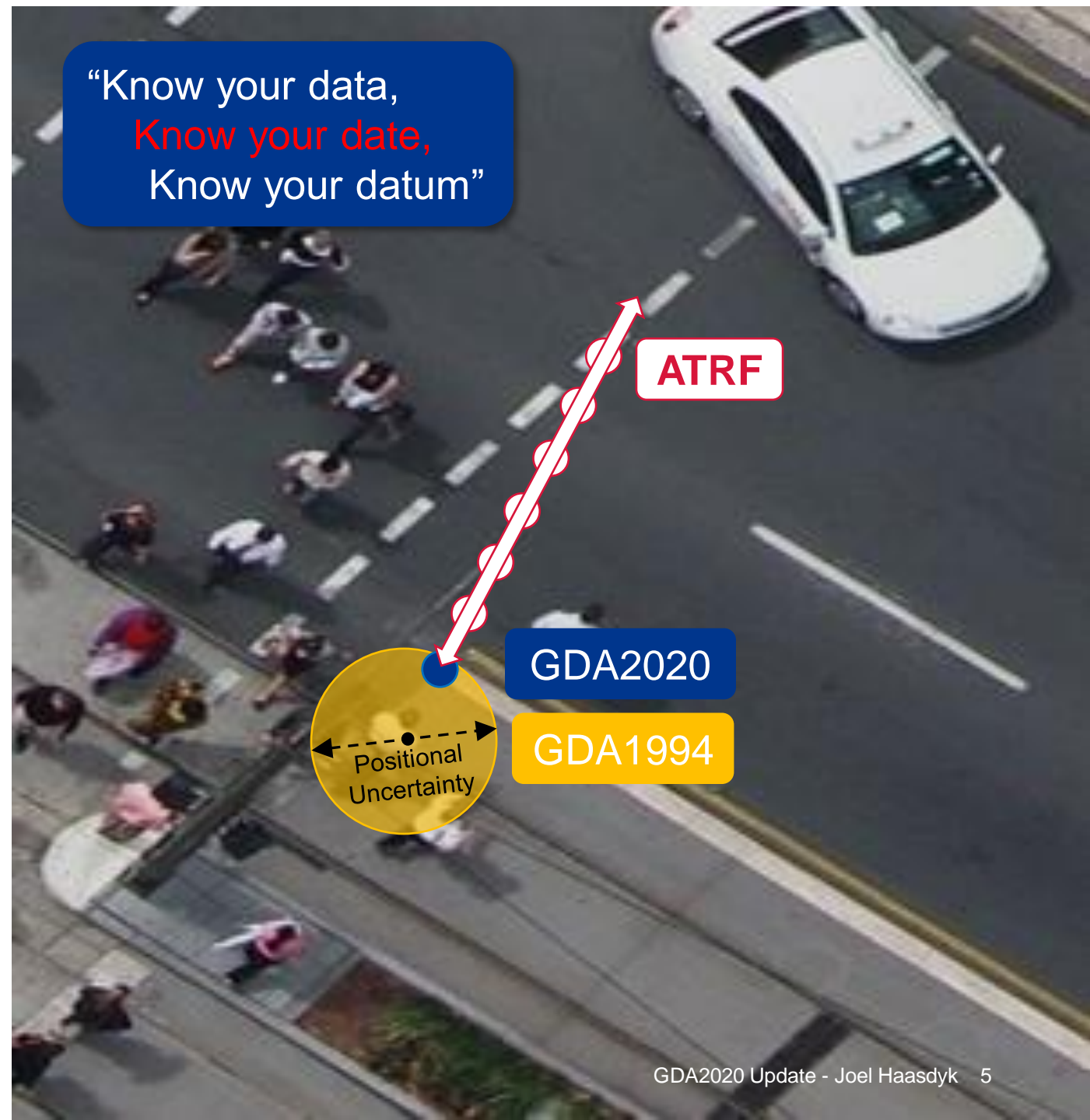
GDA94, GDA2020 ... and ATRF

Geocentric Datum of Australia 2020 (GDA2020)

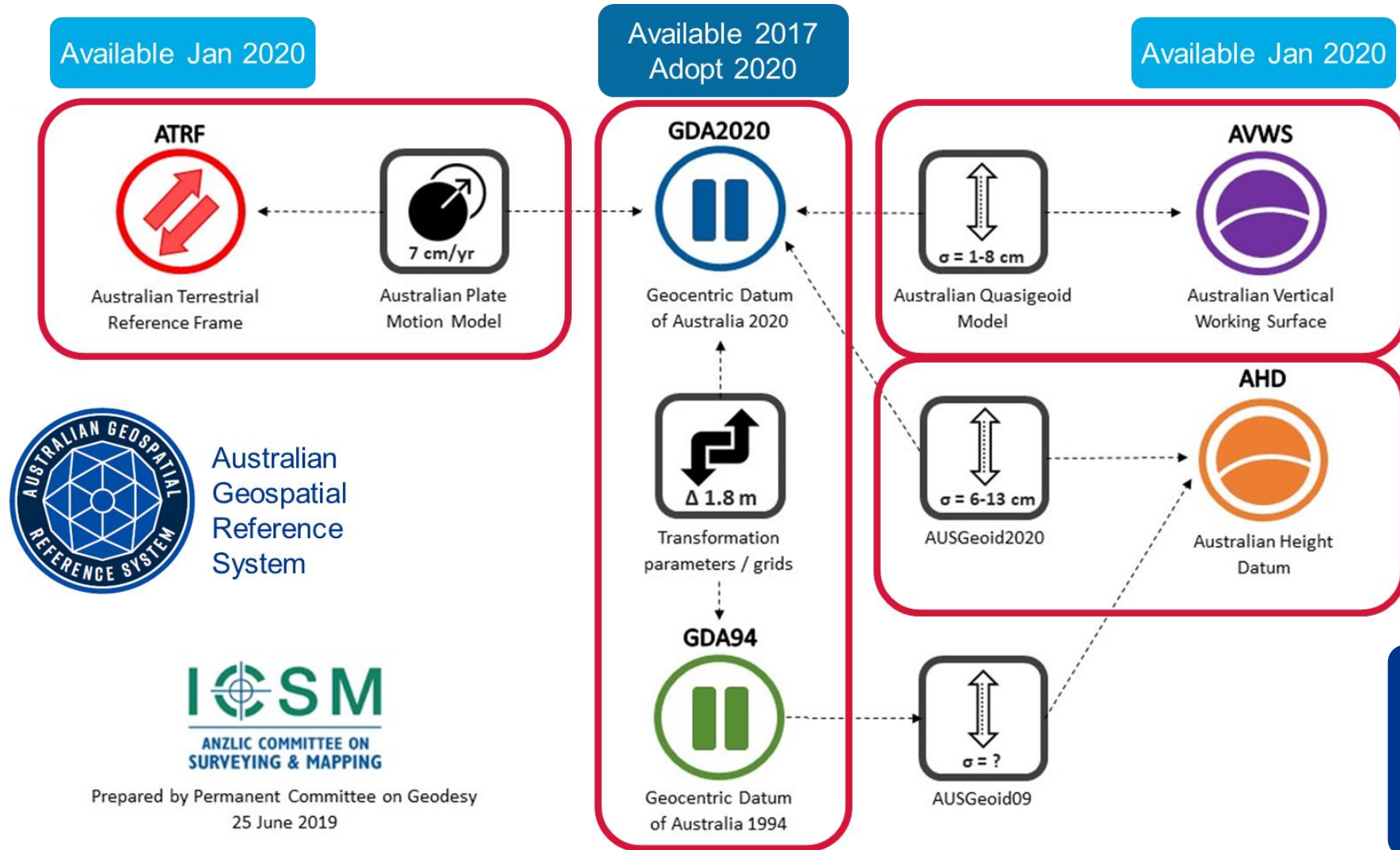
- STATIC like GDA94
- ~1.5m NNE of GDA94
- Better precision

Australian Terrestrial Reference Frame (ATRF)

- "Time-dependent"
- 7cm / year toward NE
Australian Plate Motion Model + [deformation?]
- Future proofing



Australian Geospatial Reference System (AGRS)



Australian Geospatial Reference System



Prepared by Permanent Committee on Geodesy
25 June 2019

- ICSM webinars**
- 1) AGRS
 - 2) GDA2020
 - 3) ATRF
 - 4) Height



<http://icsm.gov.au/upgrades-australian-geospatial-reference-system>
<https://www.icsm.gov.au/webinar-series-australian-geospatial-reference-system>

Transforming from GDA94 to GDA2020

Horizontal

- 7 Parameter Transformation (3D)
‘Conformal only’ – preserves shape
- NTV2 Transformation Grids (2D)
 - 1) ‘Conformal only’ – preserves shape
 - 2) ‘Conformal and distortion’ (CPD) **used in NSW**

Height

- No change to AHD71 heights
- ...but AHD-derived (from GNSS Ellipsoidal Height) requires new AUSGeoid model

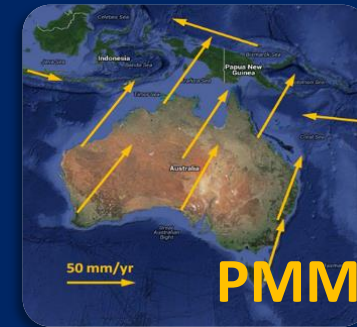
GDA94 + AUSGeoid09

GDA2020 + new AUSGeoid2020

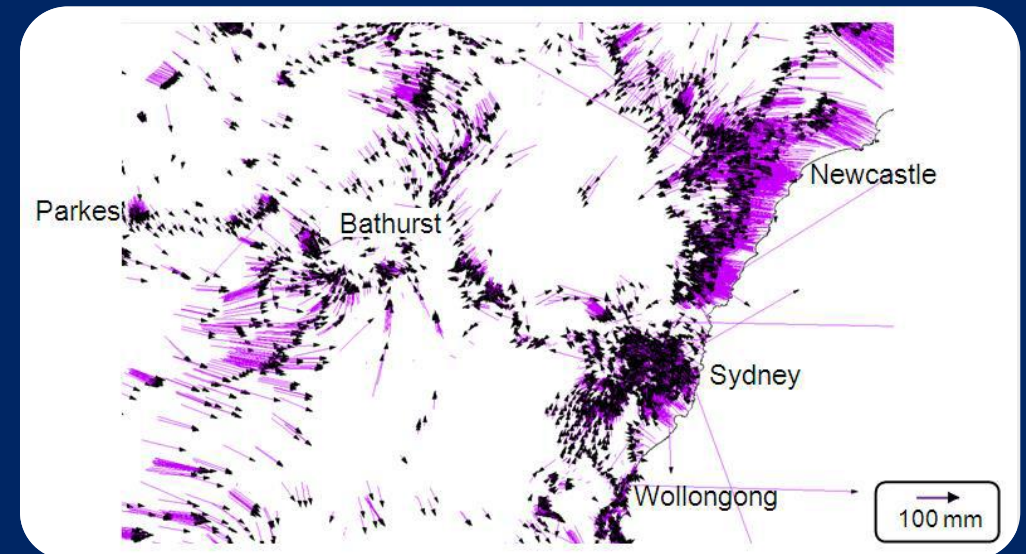
100 - 300mm
improvement



GDA94
ITRF1992 @ 1994.0



GDA2020
ITRF2014 @ 2020.0



Standards Updates (largely to support ATRF, WGS84 issues)

ANZLIC

- [‘Preparing Metadata for GDA2020 and the AGRS’](#) includes examples (May 2020)

GMIWG

- [‘Advisory on WGS 84 and Web Mapping’](#) (June 2020)

ISO updates for Dynamic Datum

- ISO19111: Spatial Referencing by Coordinates (2019)
- ISO19115-1: Metadata (Published Dec 2020)
- ISO19115-3: Metadata as XML (in draft, expect Dec 2022)
- ISO6709: Geographic point location by coordinates (in revision, expect Dec 2021)

EPSG updates

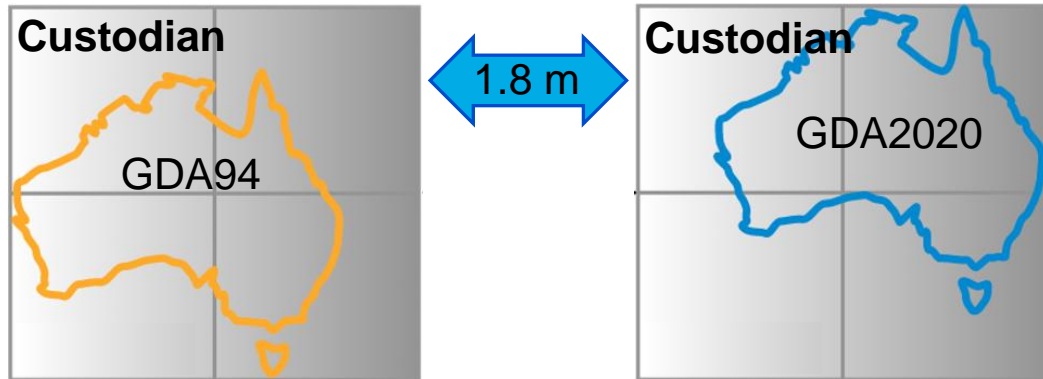
(Coordinate Reference System codes)

- WGS84 = low accuracy (2m) static ensemble
- GDAXx <non-NULL Tf> WGS 84 ensemble (published Jan 2021)
- ATRF (Aug 2020)
- AVWS height (Aug 2020; updated Jan 2021)
- Compound Horizontal + Height [2D + 1D] (published Jan 2021)

OGC (Open Geospatial Consortium) updates

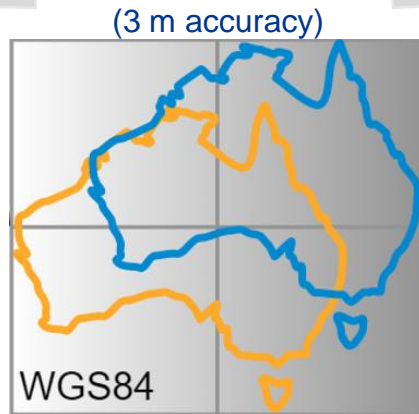
- Updates needed for WMS / WMTS, GML, KML, GeoJSON, etc
- [OGC APIs](#) - Features [Part 1 = WGS84 only. Part 2 = Any CRS] (released Feb 2020)
- Deformation Grid and Exchange format(s) (Progressing well in 2020, Draft standards expected 2021)

WGS84 / Web-Mercator: Misalignments



NULL

~~NULL~~ ESRI (WGS84)



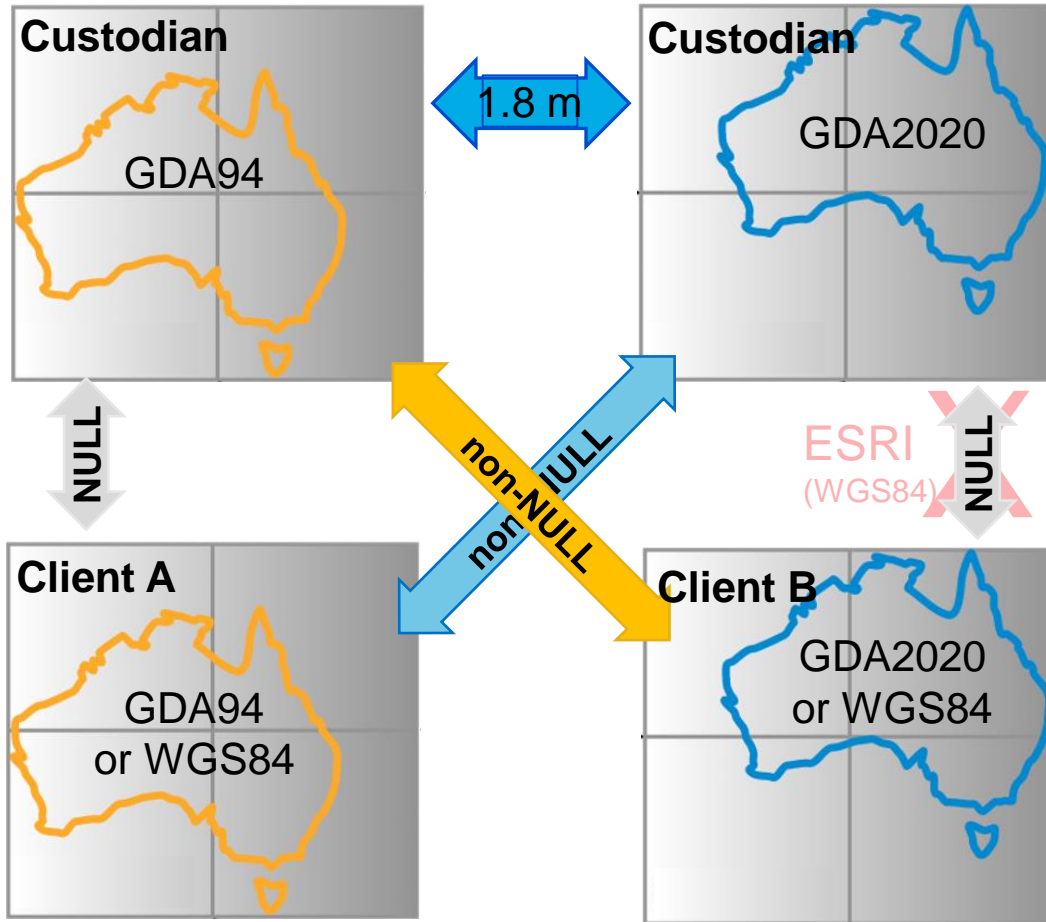
EPSG codes GDA94 <NULL> WSG 84

EPSG Code	Name	Description	Accuracy
1150	GDA94 to WGS 84 (1)	Null Tf	3m
8450	GDA2020 to WGS 84 (2)	Null Tf	3m

“Why are my maps out by 1.8 meters?”



WGS84 / Web-Mercator: EPSG update (Jan 2021)



New EPSG codes for GDAxx <> WGS 84 (Jan 2021)
To support user-choice, rather than custodian choice

EPSG Code	Name	Description	Accuracy
1150	GDA94 to WGS 84 (1)	Null Tf	3m
8450	GDA2020 to WGS 84 (2)	Null Tf	3m
9688	GDA94 <7P Conformal> WGS 84	Non-null Tf ...	3m
9689	GDA94 <NTv2-CPD> WGS 84	Non-null Tf ...	3m
9690	GDA2020 <7P Conformal> WGS 84	Non-null Tf ...	3m
9691	GDA2020 <NTv2-CPD> WGS 84	Non-null Tf ...	3m

Recommend:

- Adopt all EPSG codes for GDAxx <> WGS84
- Make available for users in all workflows
- Record lineage
- Adopt WGS84 = GDA2020

e.g. ESRI will adopt new EPSG from:

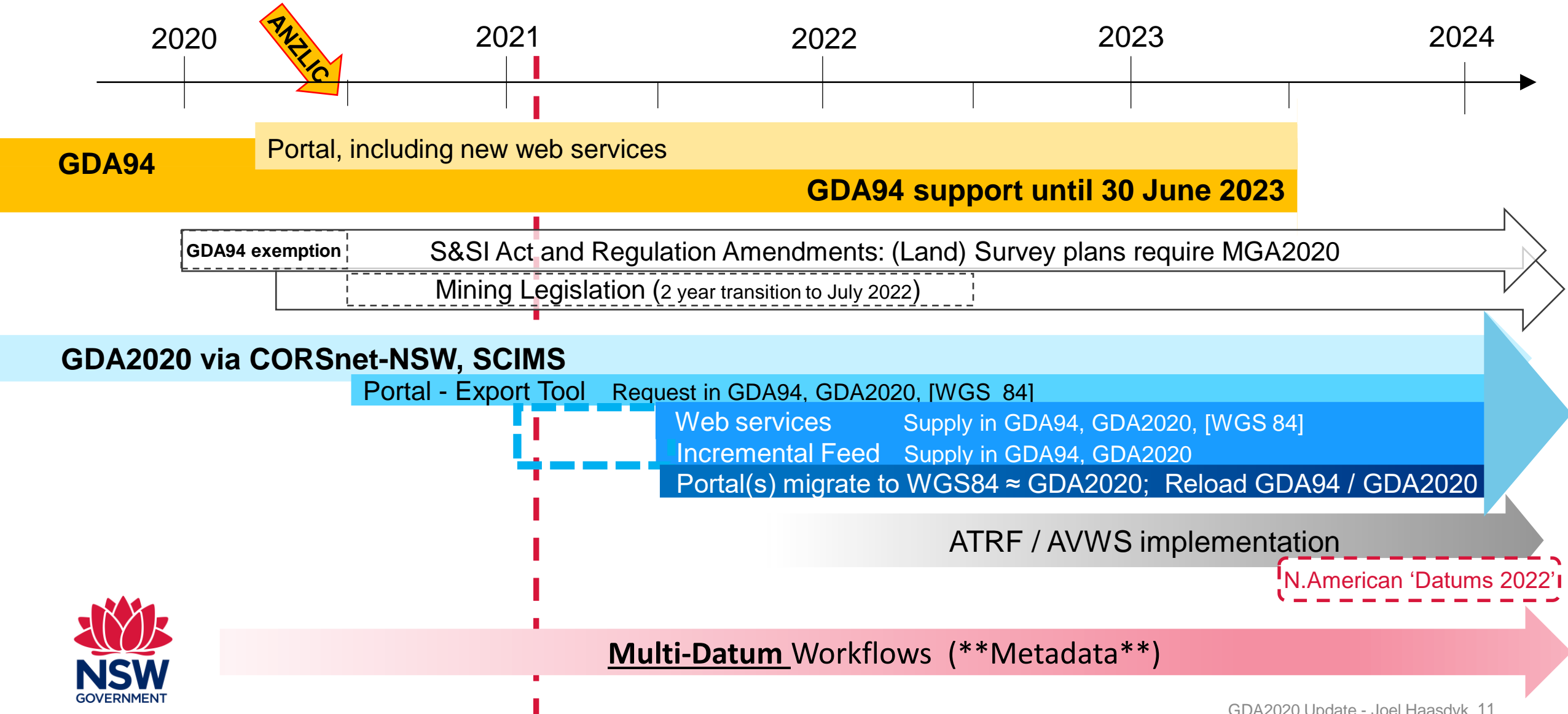
- ArcGIS Pro 2.9 from March / April 2021
- Enterprise 10.9.1 from Nov / Dec 2021

In NSW you will choose:

GDA94 < NTv2-CPD > WGS84
GDA94 < 7P > WGS84



GDA2020 Timeline (at Jan 2021, Spatial Services DCS; Dates are approximate)



DCS Spatial Services GDA2020 Preparations

Where are we now? What's coming next?

Complete:

- 10 Feb 2019: [CORSnet-NSW](#) available in GDA2020 (and GDA94)
- 01 July 2019: [SCIMS Online](#) (Survey Control) available in GDA2020 (and GDA94)
- 01 Jan 2020: [Legislation](#) S&SI Act & Reg updated to require GDA2020 orientation & cords
- 15 May 2020: [Legislation](#) Survey and Drafting Direction for Mining Surveyors also updated
- 30 June 2020: [ANZLIC nominated deadline](#) to support GDA2020 FSDF
- 01 July 2020: [Spatial Collaboration Portal](#) export of FSDF in GDA94 and GDA2020
- 01 July 2020: [Spatial Data](#) webpage updated: Comprehensive list of products supported

Next steps:

- Q1-Q2 2021: **Web-services** in GDA94 & GDA2020, [WGS 84]
Incremental Feed in GDA94 & GDA2020
- **01 July 2021:** Spatial Collaboration Portal **and Hosting Portal** to migrate to GDA2020 'native'
- 30 June 2023: DCS Spatial Services commits to deliver and receive GDA94 data until 2023

In addition:

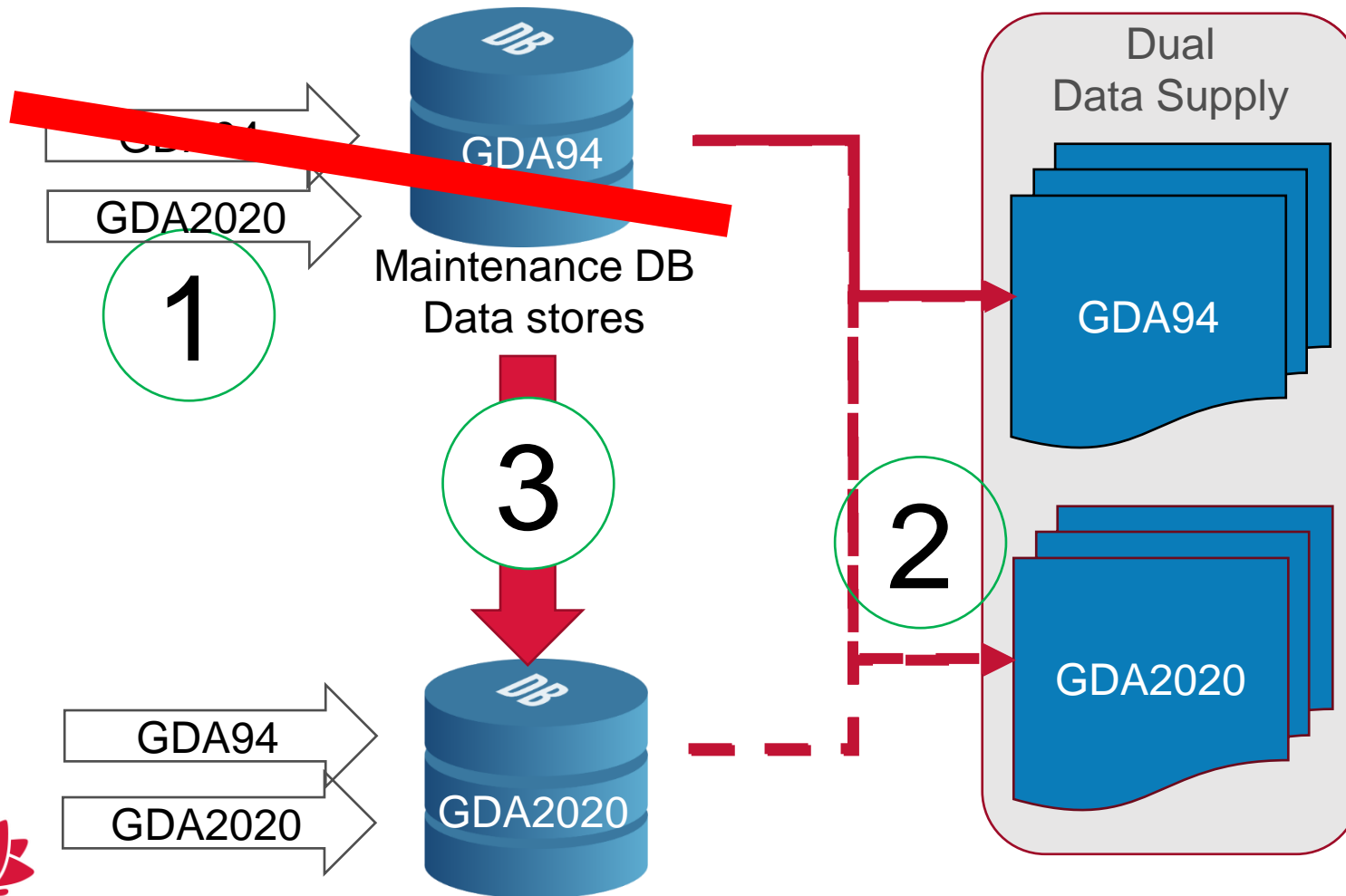
- DCS will maintain GDA94 databases (under the bonnet) until next architecture change.
- ELVIS – Elevation data (Geoscience Australia), currently has GDA94 <> GDA2020 demo on limited data; Timeline TBD.
- PSMA / Geoscape – some new API's for testing. Not yet across full product suite (Timeline TBD)



WGS84 = GDA2020
From July 2021 (TBC)

Reload Portal(s) data as
GDA94 or GDA2020

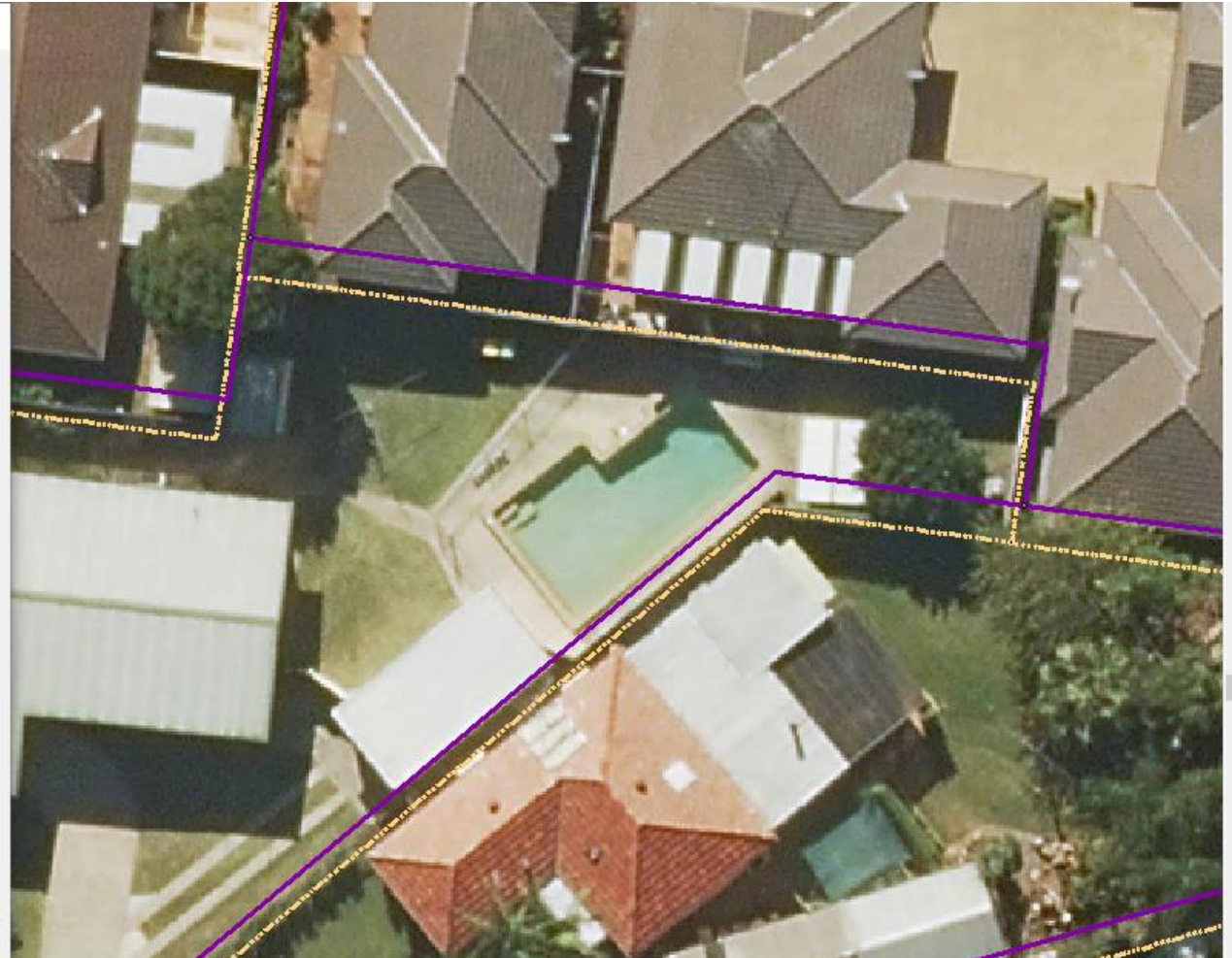
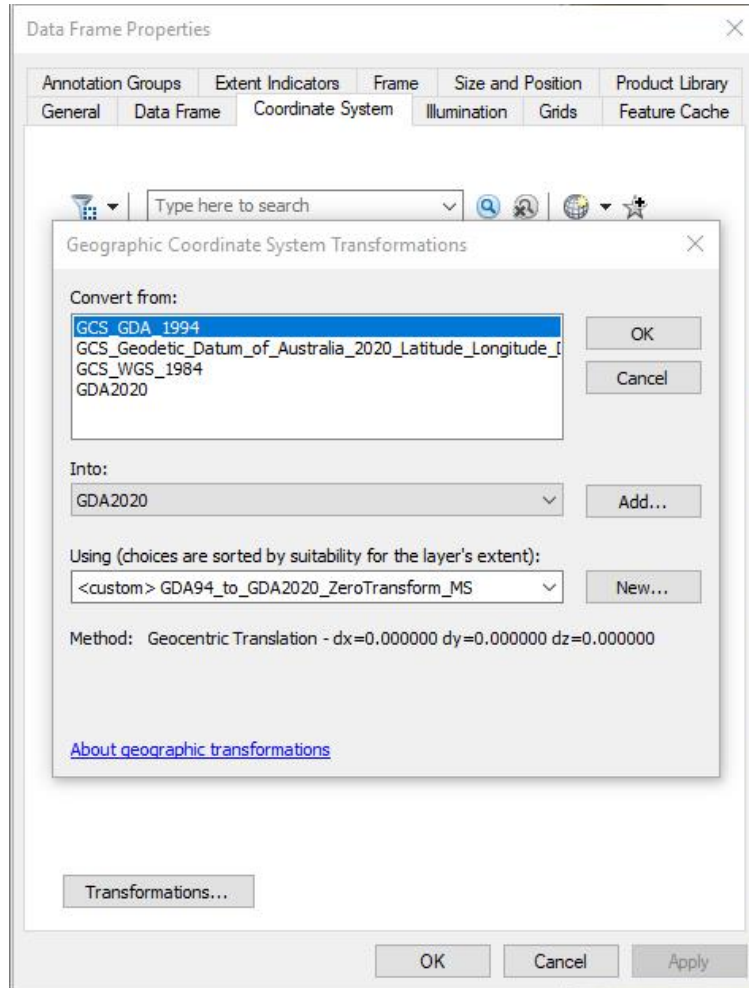
Recommended path to create GDA2020 workflows



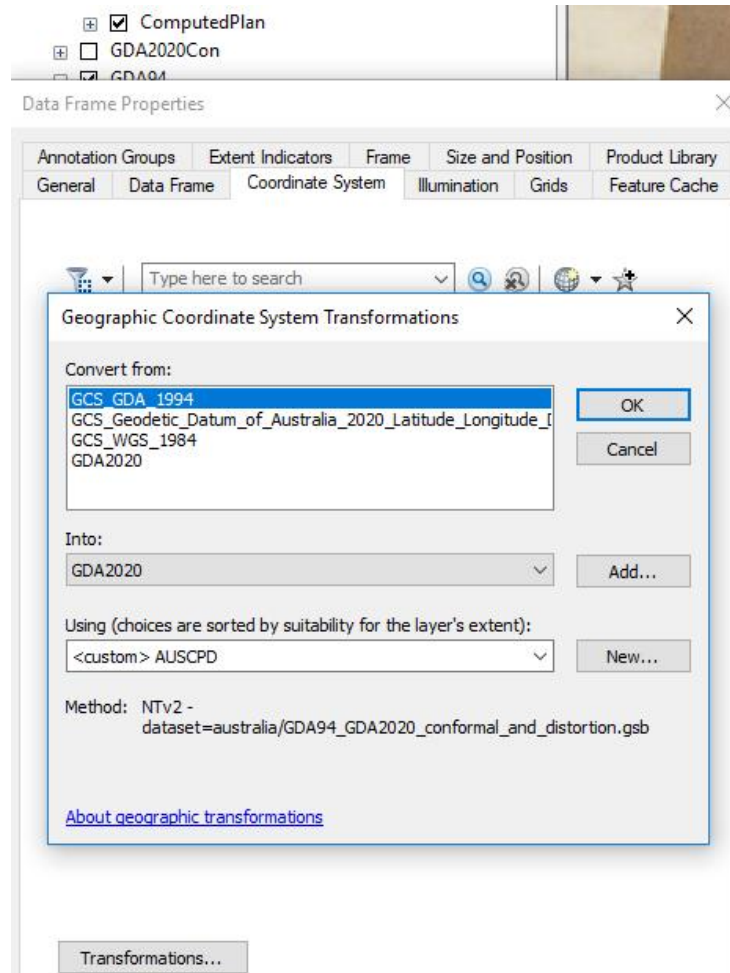
Recommended path to prepare for GDA2020

- 1) Receive GDA2020 data (and GDA94)**
Retain GDA94 workflow
Store incoming data, as supplied
- 2) Deliver GDA2020 data (and GDA94)**
...on demand
- 3) and then, when prepared...**
migrate GDA94 workflows and data to GDA2020 workflows.

Transform On The Fly (client-side)



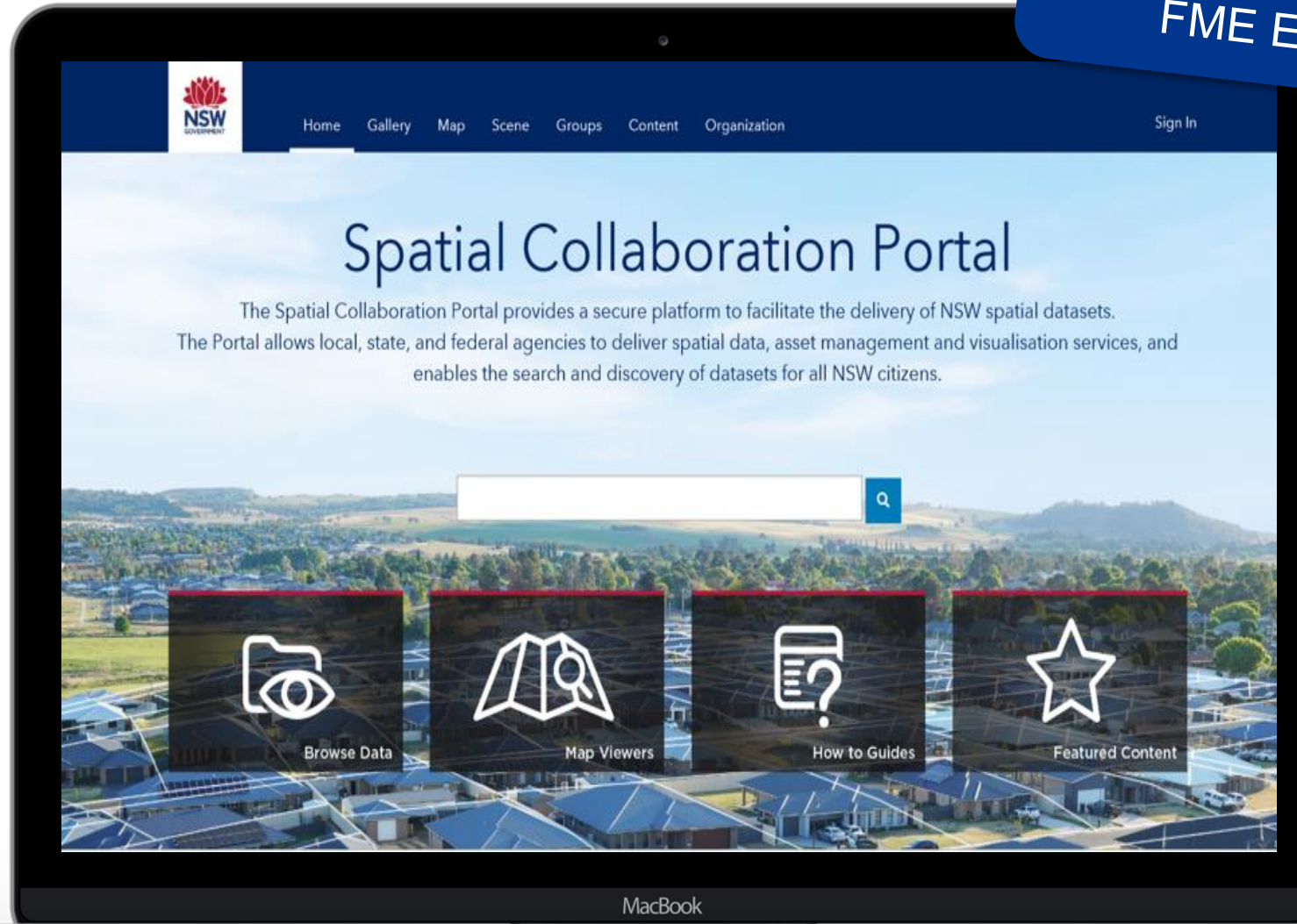
Transform On The Fly (client-side)



Spatial Collaboration Portal

<https://portal.spatial.nsw.gov.au>

Download
GDA94 and GDA2020 via
FME Export Tool



Need more information of what is available? GDA94 & GDA2020 products, Information sheets

https://www.spatial.nsw.gov.au/products_and_services/spatial_data

Spatial Services data supply options GDA94 / GDA2020 (1 Jan 2021)

Service Delivery Supply Mechanism	Data File	GDA94	GDA2020
CORSnet-NSW via Authorised Resellers	Precision Positioning		
SCIMS Online (registration information) via SIX	Survey Control Information		
*The official source for SCIMS information			
SCIMS web services via Spatial Collaboration Portal	SurveyMarkGDA94 SurveyMarkGDA2020		
*See more information online			
Data Export Functions via Spatial Collaboration Portal Open data self-service *See How To Guide This function provides download capability of data to be stored in your own system. # Point Cloud and DEMS available from ELIVS	NSW Imagery		
	NSW Administrative Boundaries		
	NSW Elevation and Depth [#]		
	NSW Geocoded Addressing		
	NSW Landcover ²		
	NSW Land Parcel Property		
	NSW Place Names ³		
	NSW Positioning		
	NSW Transport		
	NSW Water		

<https://www.spatial.nsw.gov.au/surveying/geodesy/gda2020>

Spatial Services GDA2020 Update
Information Sheet October 2020

GDA2020 NSW Legislation Amendments
Information Sheet October 2020

To support the adoption of the [Geocentric Datum of Australia 2020 \(GDA2020\)](#), legislation governing surveying and spatial information in NSW has been updated. The Office of the Surveyor-General is also advising NSW Government on the modernisation and rationalisation of the relevant legislation under the control of several NSW Ministries.

Amendments to the Surveying and Spatial Information Act and Regulation

The [Surveying and Spatial Information Act 2002 \(NSW\)](#) and [Regulation 2017 \(NSW\)](#) (S&SI Act and Regulation) define the prescribed datum in NSW for the state control survey, state cadastre and surveys carried out for or on behalf of the Surveyor-General or a public authority. They also provide a mechanism for the Government to authorise the collection and distribution of other spatial information.

The simple message...

in a multi-datum environment metadata is key!

GDA94

GDA2020

ATRF / AVWS

WGS84

Questions? Comments!

- [GDA2020 Information Sheet](#) (Oct 2020)
- [GDA2020 Legislation amendments](#) (Oct 2020)
- [NSW GDA2020 and AGRS Implementation Policy](#) (Oct 2020)

- Webinar Series on the [Australian Geospatial Reference System](#) (GDA2020, ATRF, AVWS etc,)
- NSW DCS website on GDA2020 <https://www.spatial.nsw.gov.au/surveying/geodesy/gda2020>
- ICSM FAQs, Fact Sheets, Forum <https://www.icsm.gov.au/gda2020>
- Tools: <https://www.icsm.gov.au/datum/gda-transformation-products-and-tools/software-and-plugins>
- NTV2 Grids https://github.com/icsm-au/transformation_grids
- Online Transformation service <http://positioning.fsdf.org.au/>
- Datum spreadsheet(s) <https://github.com/icsm-au/DatumSpreadsheets>

- Email to: GDA2020@customerservice.nsw.gov.au

