Hard Copy Map Production Using GIS Principles

Bruce McGurty

EXPLORE AUSTRALIA PUBLISHING

National Oracle Spatial User Forum

MELBOURNE 2006

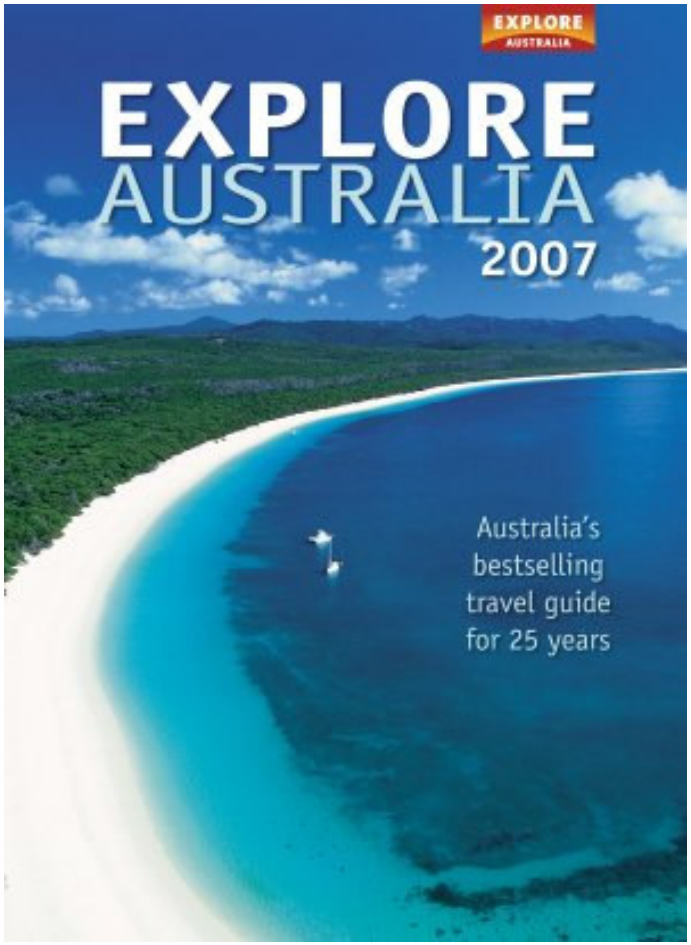
EXPLORE AUSTRALIA

THE COMPANY

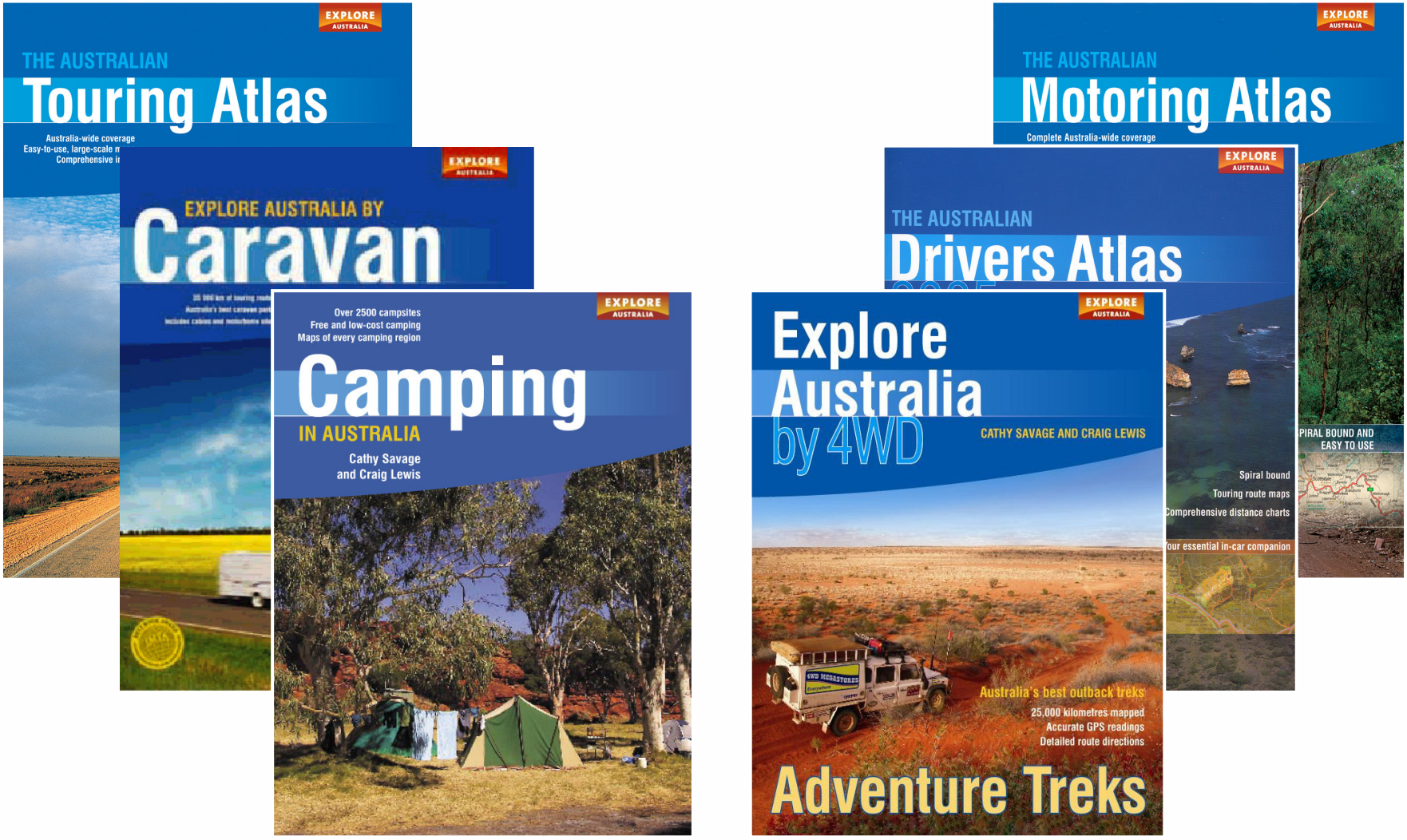
EXPLORE AUSTRALIA

HARDIE GRANT PUBLISHING

THE BOOK



MAPS, GUIDES & ATLASES



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The Last 15 years

Origin

- Sheet maps → Book based maps
- Market leader

Technology changes

- Autodesk™ AutoCAD
- Reduced production times
- 900 DWG files

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Effect & Labour

Maintenance & storage

- Serviced needs for 10 years
- Quality products

Limitations

- Reliance on CAD environment
- Same edits 3 to 4 times over
- Limited feature intelligence & metadata

No longer cost or time effective

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Map Production System

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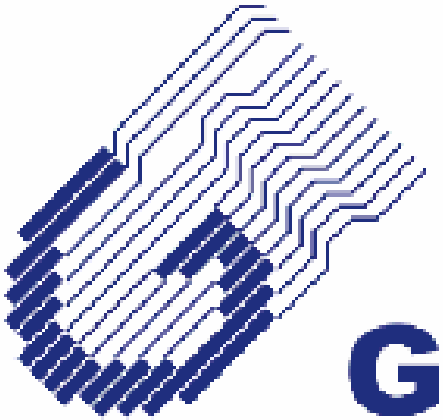
and



Geomatic Technologies

Key Requirements

- Leverage off existing skills
- Automation, flexibility & maintain high cartographic standards
- Reduce maintenance & map rework
- Geo-spatial data store / accept updates
- Streamline map production / GIS

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Map Production Solution

- No commercial GIS addressed our needs
- Process driven data model
- Autodesk™ Map & Oracle™ Locator
- Targeted custom development
  - Automation & flexibility
- Generating quality product

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Geo-spatial BASE Data

- 1:250K Topographic Data
- Nationally consistent feature attributes

PSMA Australia LIMITED

- Topo Data at various scales
- Transport theme updated every 3 months
- One contact

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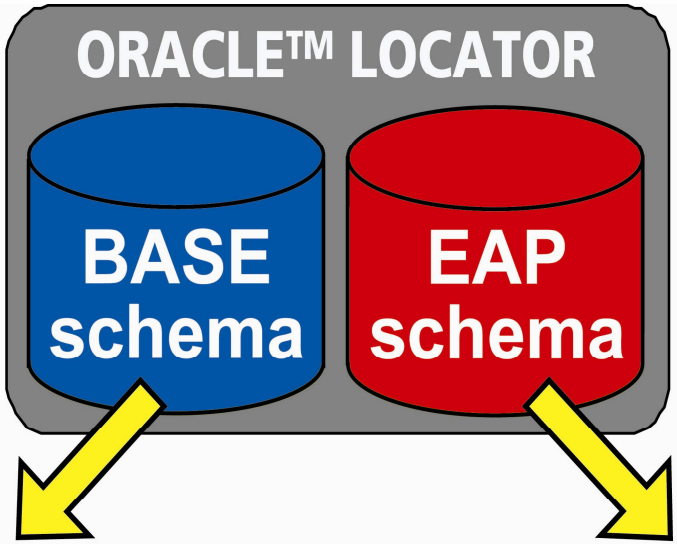
- Field-captured data
- GPS waypoints and track files

Geographic Feature Storage



* Original unformatted
* Intelligent data
* Third party
* Field captured
* Customized & flexible

* Cartographically formatted
* Publication specific info stored
* Data can be used to recreate a map

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Feature Identification Data

MPSOD

NAME	TYPE
REGION	VARCHAR2(50)
LOAD VERSION	NUMBER
EAP_UFI	VARCHAR2(100)

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Autodesk™ Map

- Separate formatting from core data
- Flexibility
  - Queries, layout, template functionality
- Manipulation of geographic features

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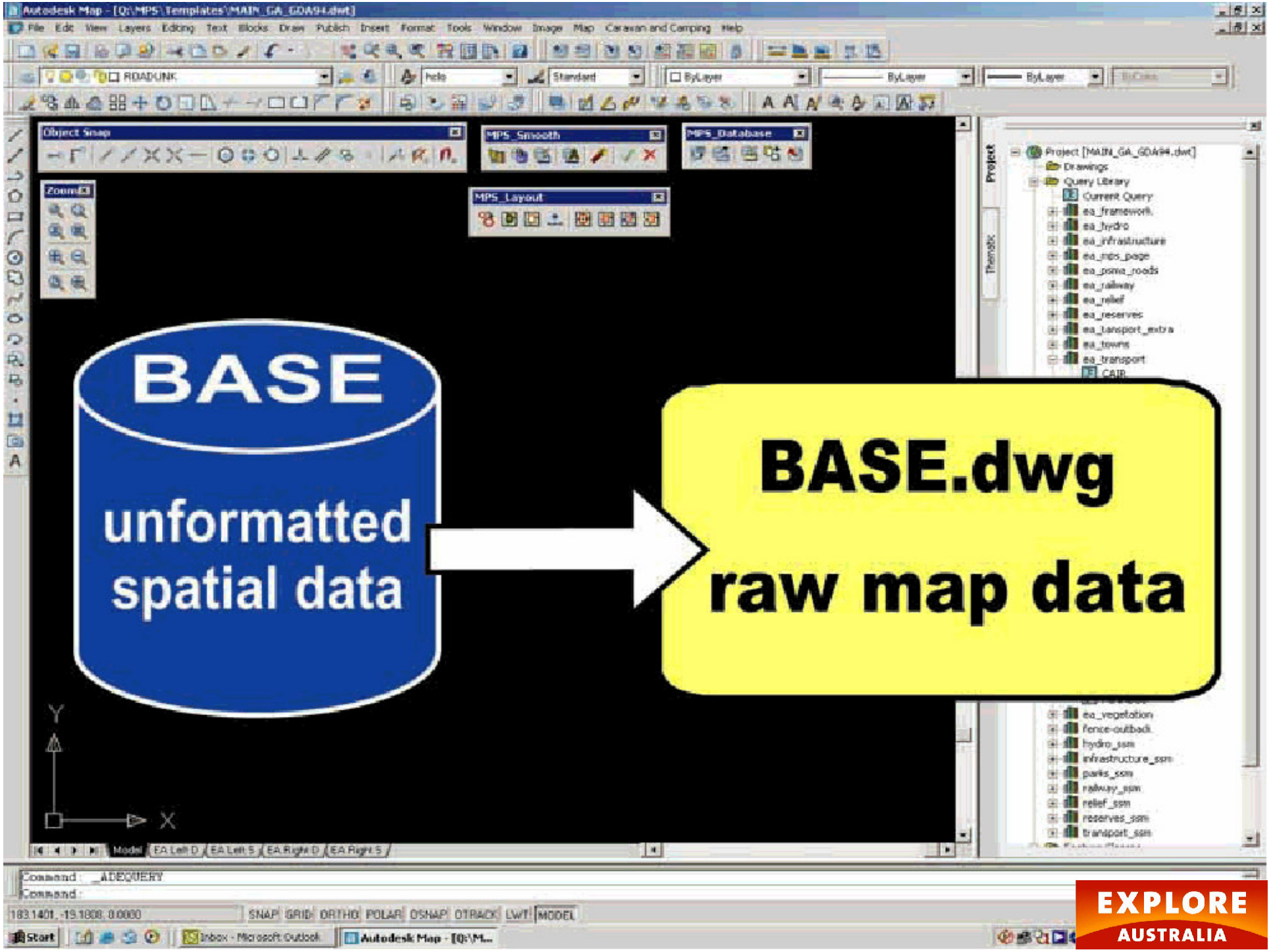
BASE
unformatted
spatial data
BASE.dwg
raw map data
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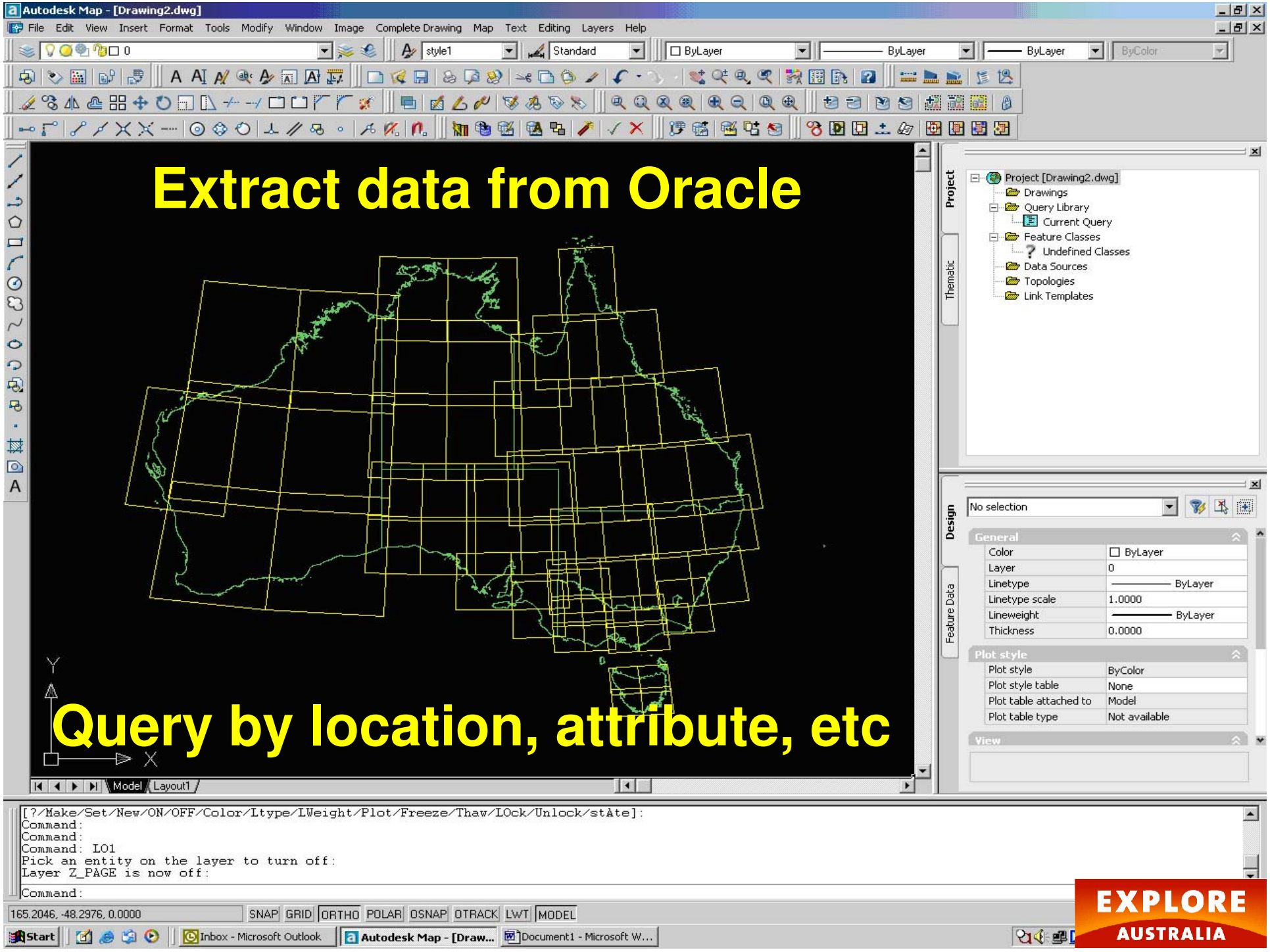
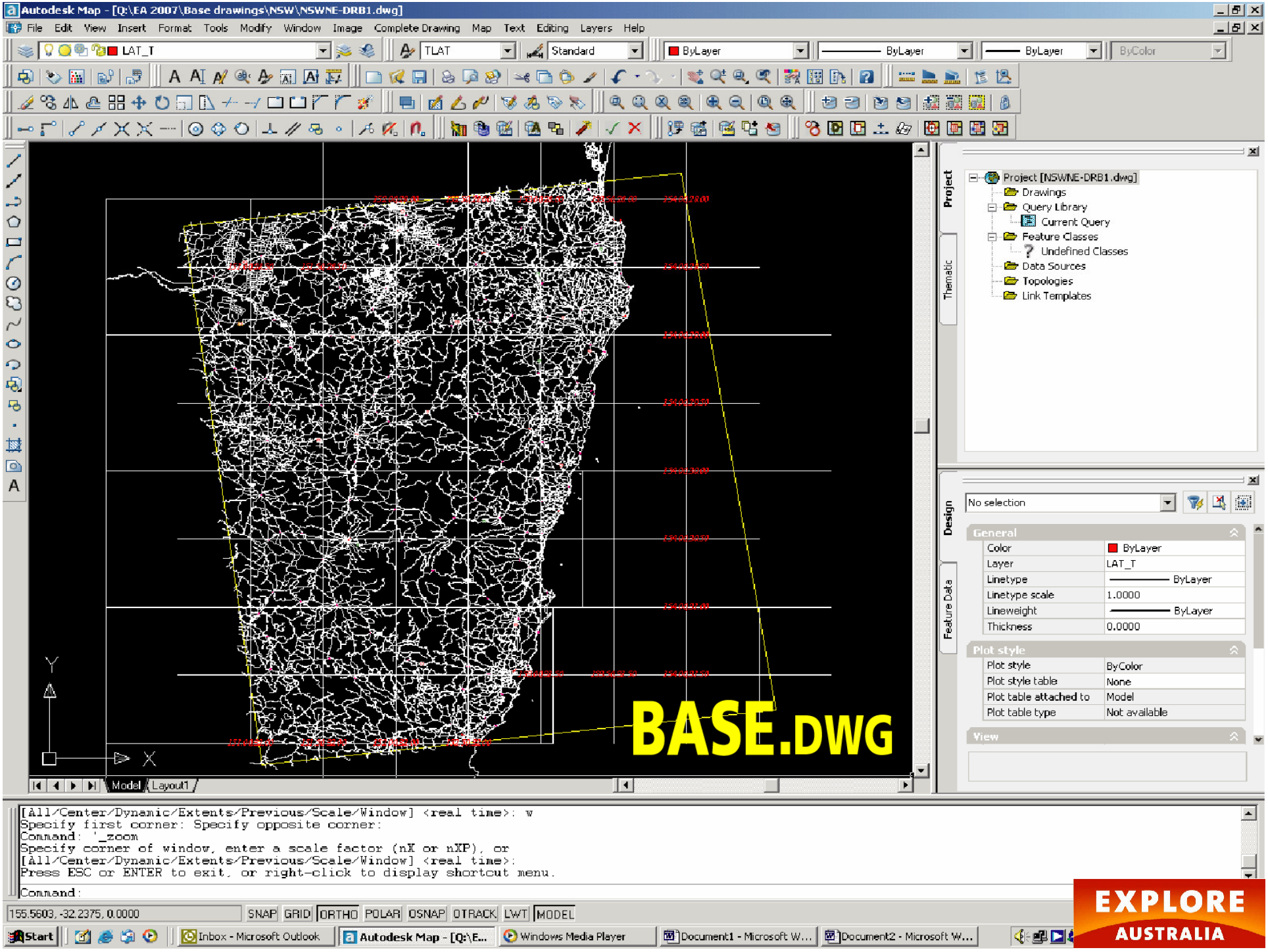

Autodesk Map - [Drawing2.dwg]
File Edit View Insert Format Tools Modify Window Image Complete Drawing Map Text Editing Layers Help
Extract data from Oracle
Query by location, attribute, etc
Project [Drawing2.dwg]
Drawings
Query Library
Current Query
Feature Classes
Undefined Classes
Data Sources
Topologies
Link Templates
Project
Thematic
Design
Feature Data
No selection
General
Color ByLayer
Layer 0
Linetype ByLayer
Linetype scale 1.0000
Lineweight ByLayer
Thickness 0.0000
Plot style
Plot style ByColor
Plot style table None
Plot table attached to Model
Plot table type Not available
View
Model Layout1
[?/Make/Set/New/ON/OFF/Color/Ltype/LWeight/Plot/Freeze/Thaw/LOck/Unlock/stAte]:
Command:
Command:
Command: LO1
Pick an entity on the layer to turn off:
Layer Z_PAGE is now off:
Command:
165.2046, -48.2976, 0.0000
SNAP GRID ORTHO POLAR OSNAP OTRACK LWT MODEL
Start
Inbox - Microsoft Outlook
Autodesk Map - [Draw...
Document1 - Microsoft W...
EXPLORE AUSTRALIA


Autodesk Map - [Q:\EA 2007\Base drawings\NSW\NSWNE-DRB1.dwg]
File Edit View Insert Format Tools Modify Window Image Complete Drawing Map Text Editing Layers Help
LAT_T
TLAT
Standard
ByLayer
ByLayer
ByLayer
ByColor
Project
Thematic
Project [NSWNE-DRB1.dwg]
Drawings
Query Library
Current Query
Feature Classes
Undefined Classes
Data Sources
Topologies
Link Templates
Design
Feature Data
No selection
General
Color ByLayer
Layer LAT_T
Linetype ByLayer
Linetype scale 1.0000
Lineweight ByLayer
Thickness 0.0000
Plot style
Plot style ByColor
Plot style table None
Plot table attached to Model
Plot table type Not available
View
BASE.DWG
Y
X
Model
Layout1
[All/Center/Dynamic/Extents/Previous/Scale/Window] <real time>: w
Specify first corner: Specify opposite corner:
Command: '_zoom
Specify corner of window, enter a scale factor (nX or nXP), or
[All/Center/Dynamic/Extents/Previous/Scale/Window] <real time>:
Press ESC or ENTER to exit, or right-click to display shortcut menu.
Command:
155.5603, -32.2375, 0.0000
SNAP GRID ORTHO POLAR OSNAP OTRACK LWT MODEL
Start
Inbox - Microsoft Outlook
Autodesk Map - [Q:\E...
Windows Media Player
Document1 - Microsoft W...
Document2 - Microsoft W...
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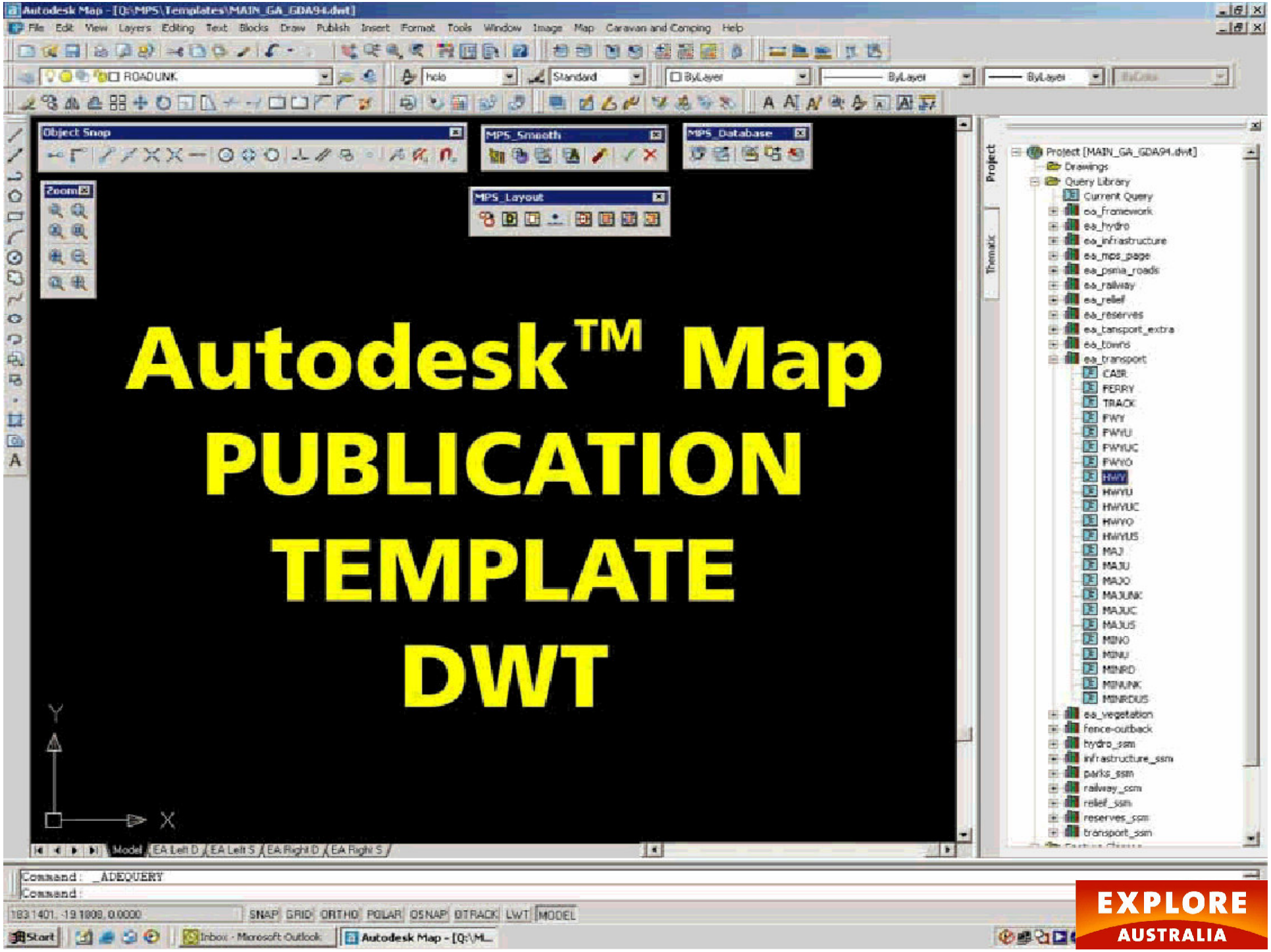
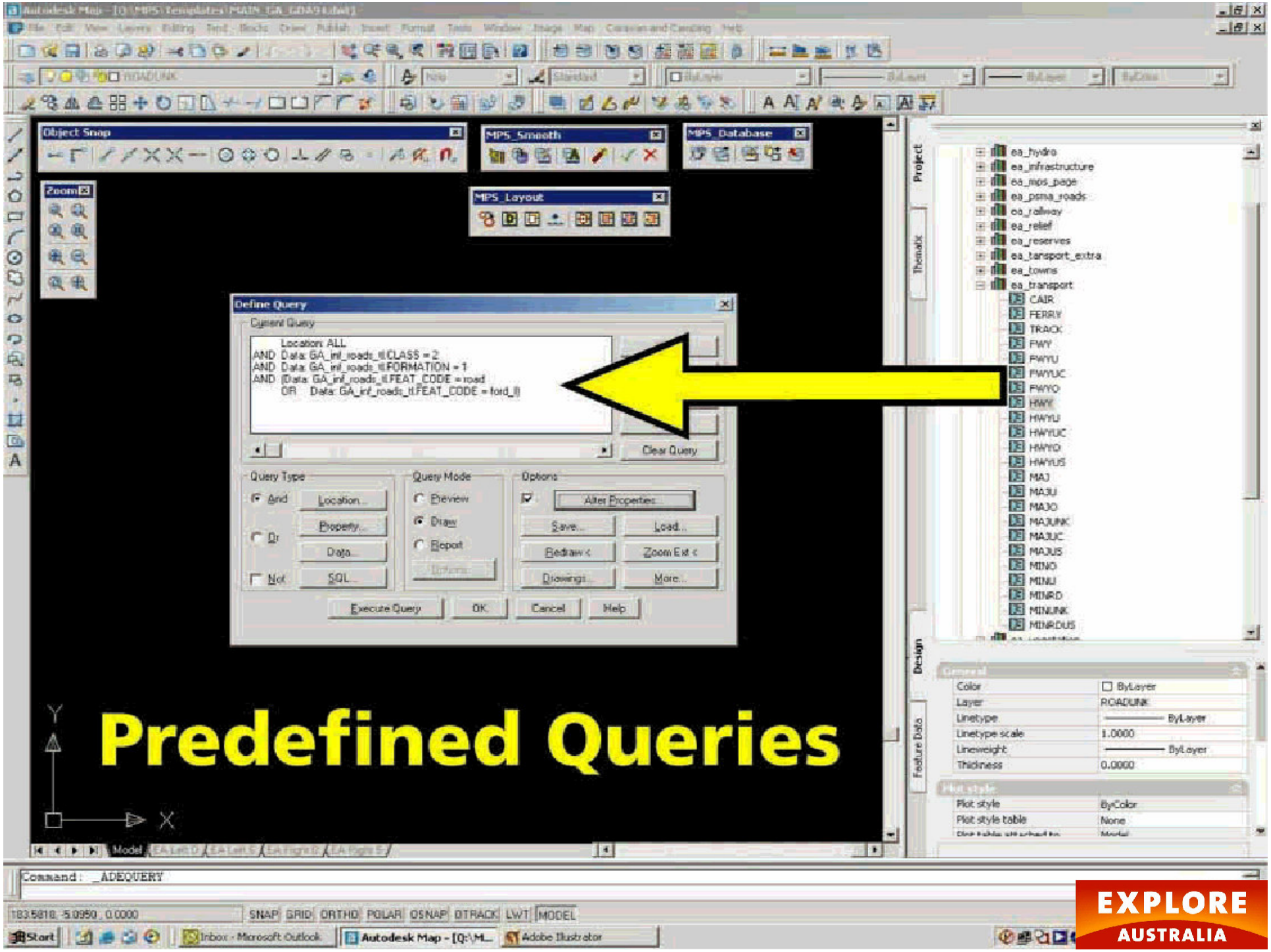
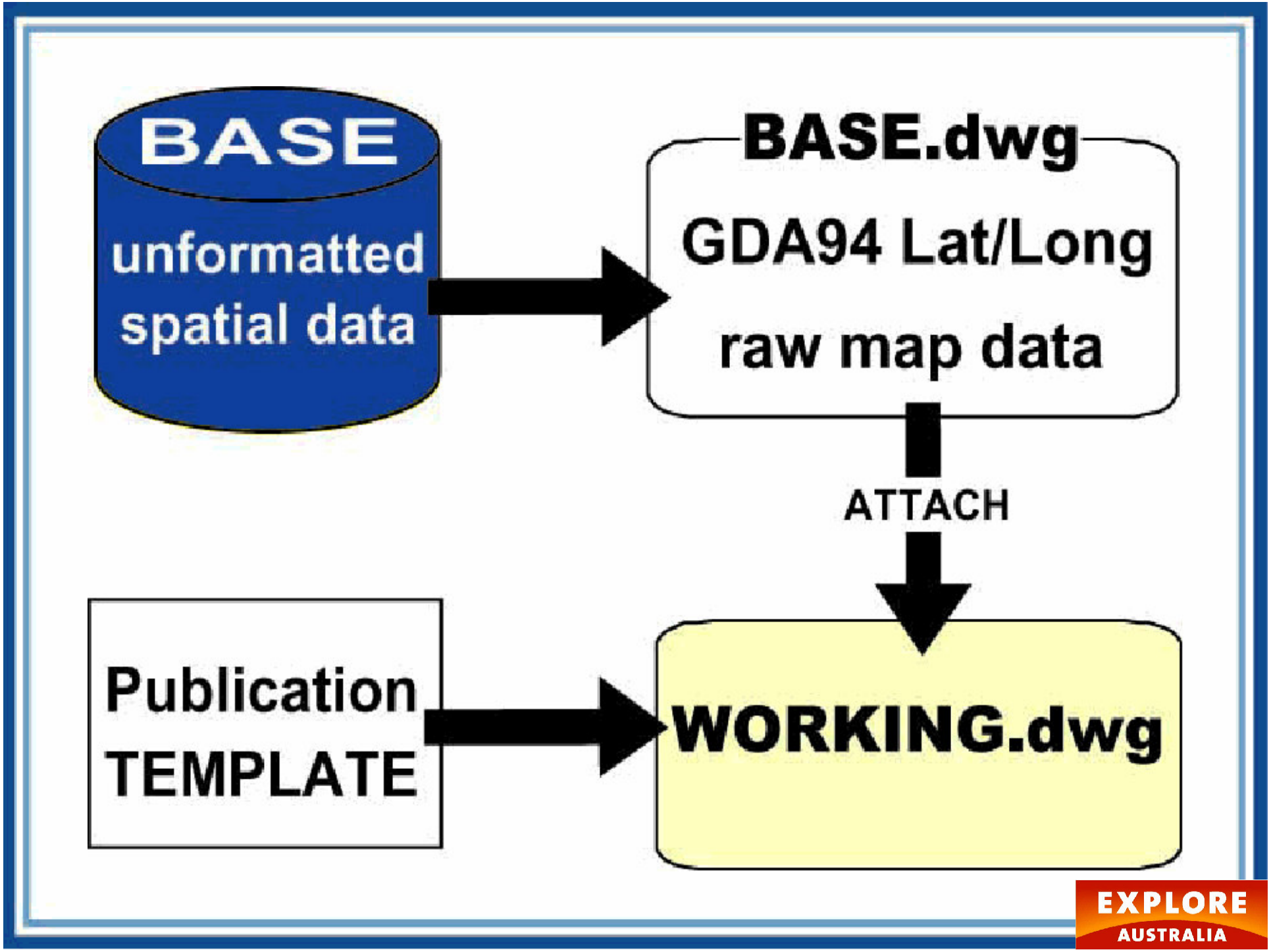
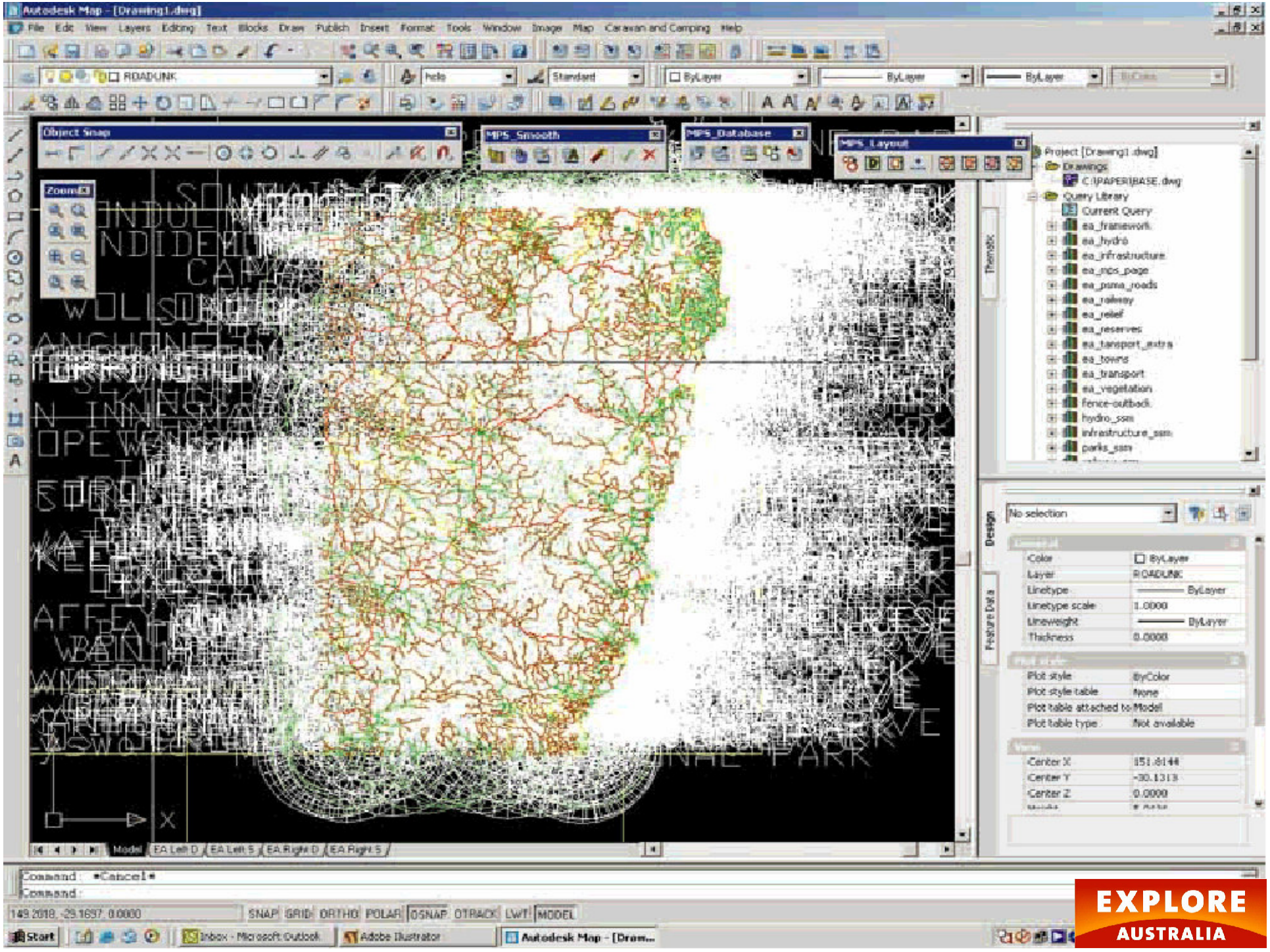
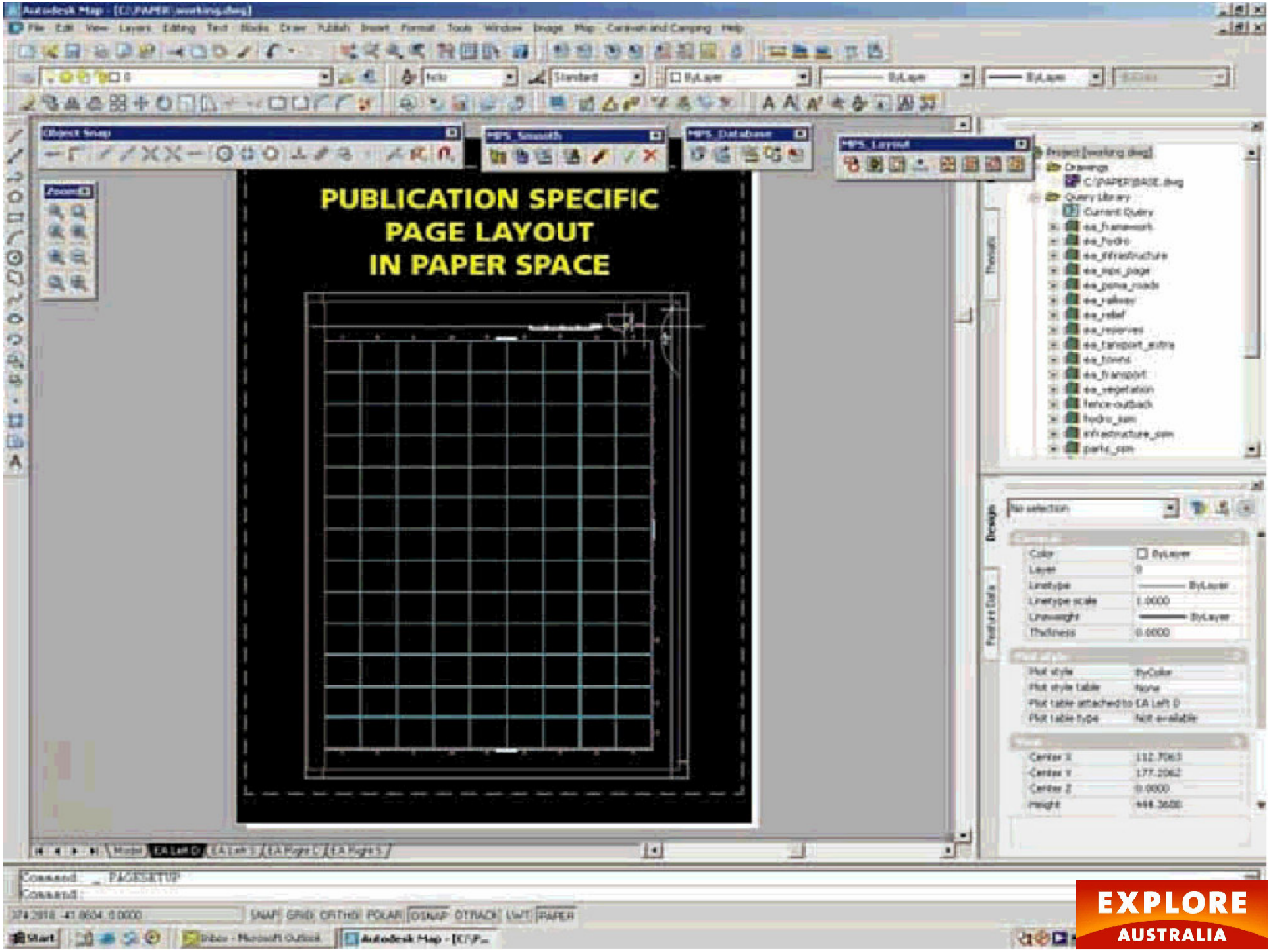

Autodesk Map - [Q:\MPS\Templates\MAIN_GA_GDA94.dwt]
File Edit View Layers Editing Text Blocks Draw Publish Insert Format Tools Window Image Map Caravan and Camping Help
Object Snap
MPS_Smooth
MPS_Database
Zoom
MPS_Layout
Project [MAIN_GA_GDA94.dwt]
Drawings
Query Library
Current Query
ea_framework
ea_hydro
ea_infrastructure
ea_mps_page
ea_psma_roads
ea_railway
ea_relief
ea_reserves
ea_transport_extra
ea_towns
ea_transport
CAIR
FERRY
TRACK
FWY
FWYU
FWYUC
FWYO
HWY
HWYU
HWYUC
HWYO
HWYUS
MAJ
MAJU
MAJO
MAJUNK
MAJUC
MAJUS
MINO
MINU
MINRD
MINUNK
MINRDUS
ea_vegetation
fence-outback
hydro_ssm
infrastructure_ssm
parks_ssm
railway_ssm
relief_ssm
reserves_ssm
transport_ssm
Autodesk™ Map
PUBLICATION
TEMPLATE
DWT
Model EA Left D EA Left S EA Right D EA Right S
Command: _ADEQUERY
Command:
SNAP GRID ORTHO POLAR OSNAP OTRACK LWT MODEL
Start
Inbox - Microsoft Outlook
Autodesk Map - [Q:\ML...
EXPLORE
AUSTRALIA

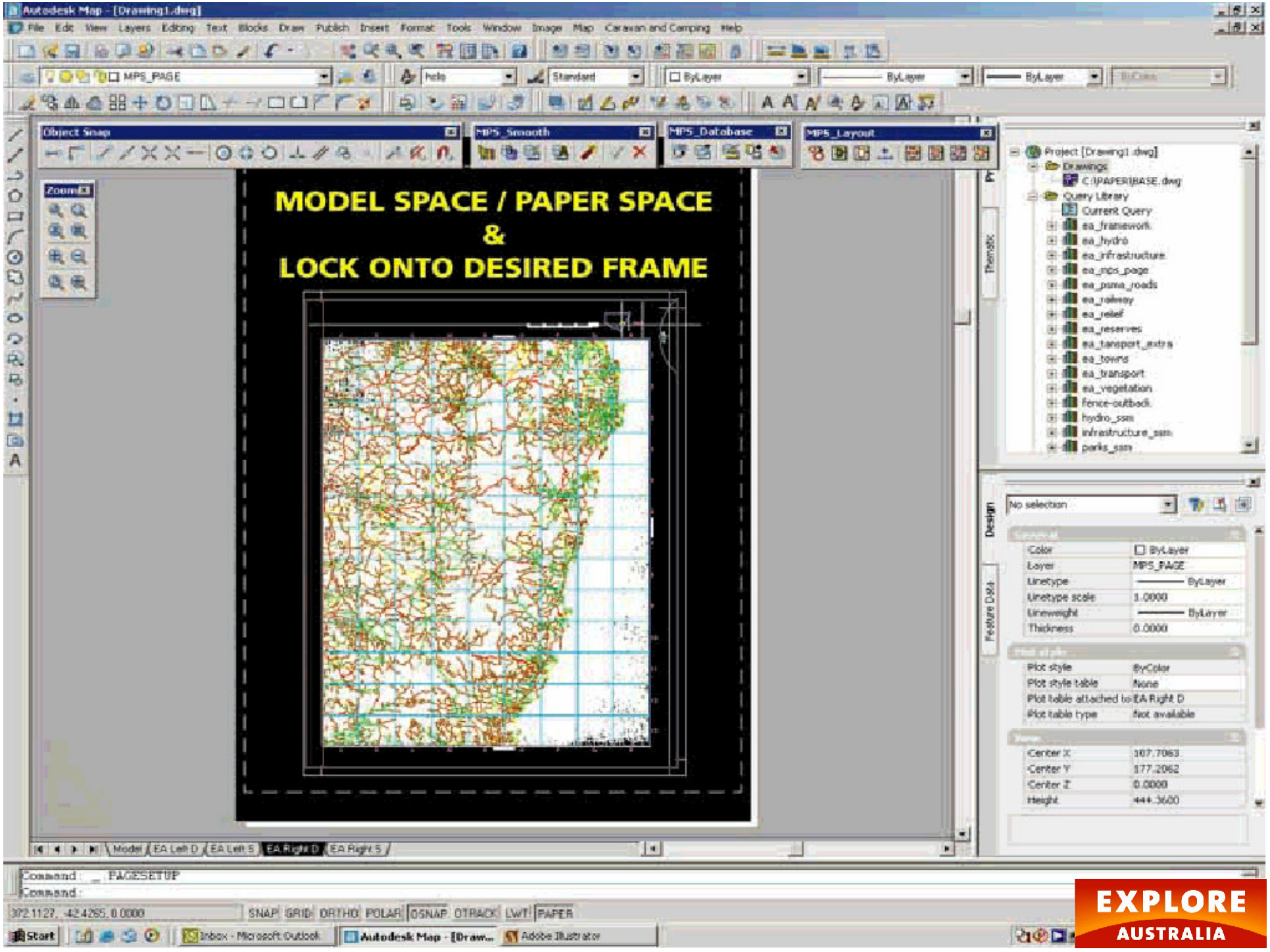

Object Snap
MPS_Smooth
MPS_Database
Zoom
MPS_Layout
Define Query
Current Query
Location: ALL
AND Data: GA_inf_roads_tl.CLASS = 2
AND Data: GA_inf_roads_tl.FORMATION = 1
AND (Data: GA_inf_roads_tl.FEAT_CODE = road
OR Data: GA_inf_roads_tl.FEAT_CODE = ford_ll)
Clear Query
Query Type
And
Or
Not
Location...
Property...
Data...
SQL...
Query Mode
Preview
Draw
Report
Options
Alter Properties...
Save...
Load...
Redraw <
Zoom Ext <
Drawings...
More...
Execute Query
OK
Cancel
Help
Predefined Queries
Project
Thematic
Design
Feature Data
ea_hydro
ea_infrastructure
ea_mps_page
ea_psma_roads
ea_railway
ea_relief
ea_reserves
ea_tansport_extra
ea_towns
ea_transport
CAIR
FERRY
TRACK
FWY
FWYU
FWYUC
FWYO
HWY
HWYU
HWYUC
HWYO
HWYUS
MAJ
MAJU
MAJO
MAJUNK
MAJUC
MAJUS
MINO
MINU
MINRD
MINUNK
MINRDUS
Color
ByLayer
Layer
ROADUNK
Linetype
ByLayer
Linetype scale
1.0000
Lineweight
ByLayer
Thickness
0.0000
Plot style
ByColor
Plot style table
None
Model
Command: _ADEQUERY
SNAP GRID ORTHO POLAR OSNAP DTRACK LWT MODEL
Start
Inbox - Microsoft Outlook
Autodesk Map - [Q:\M...
Adobe Illustrator
EXPLORE
AUSTRALIA


BASE
unformatted
spatial data
BASE.dwg
GDA94 Lat/Long
raw map data
ATTACH
Publication
TEMPLATE
WORKING.dwg
EXPLORE
AUSTRALIA



EXPLORE AUSTRALIA


PUBLICATION SPECIFIC
PAGE LAYOUT
IN PAPER SPACE
EXPLORE
AUSTRALIA


MODEL SPACE / PAPER SPACE
&
LOCK ONTO DESIRED FRAME
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DAT files

SYMBOLS

```
AIR,1.53579192
ALTNH,2.84892516
ANR,1.15958247
ASR,3.23958247
AT,
BLD
BOR
CA,
CAI
CAV
CEM
CP,
FAL
```

TEXT

```
05D_T,1.1,TII,U
1D_T,1.1,TII,U
5D_T,1.1,TII,U
ANR_T,1.4,HC,U
AT_T,1.4,HC,L
CANAL_T,1.1,T
CHRLIFT_T,1,H
AIR_T,1.1,HC,
BORE_T,1,HC,L
CAIR_T,1.2,HC
CEMETERY_P_T,
FALL_T,1.1,TI
FERRY_T,1.1,H
FLOOD_T,1.1,T
```

LAYERS

```
5     "05D"   0   0   1   0.1
5     "1D"    0   0   1   0.1
5     "5D"    0   0   1   0.1
7     "ARD"   0   0   1   0.3
9     "ARDUS" 0   0   1   0.3
1     "BDY"   0   0   1   0.1
14    "BORDER"  0   0   1   1
7     "BRKWATER"  0   0   1   0.1
5     "CANAL"   0   0   1   0.1
7     "CEMETERY"  0   0   1   0
7     "CHRLIFT"   0   0   1   0.1
5     "CK"    0   0   1   0.075
63    "CLIFFLNE"  0   0   1   0.1
```

- Provide relationship between model space & paper space

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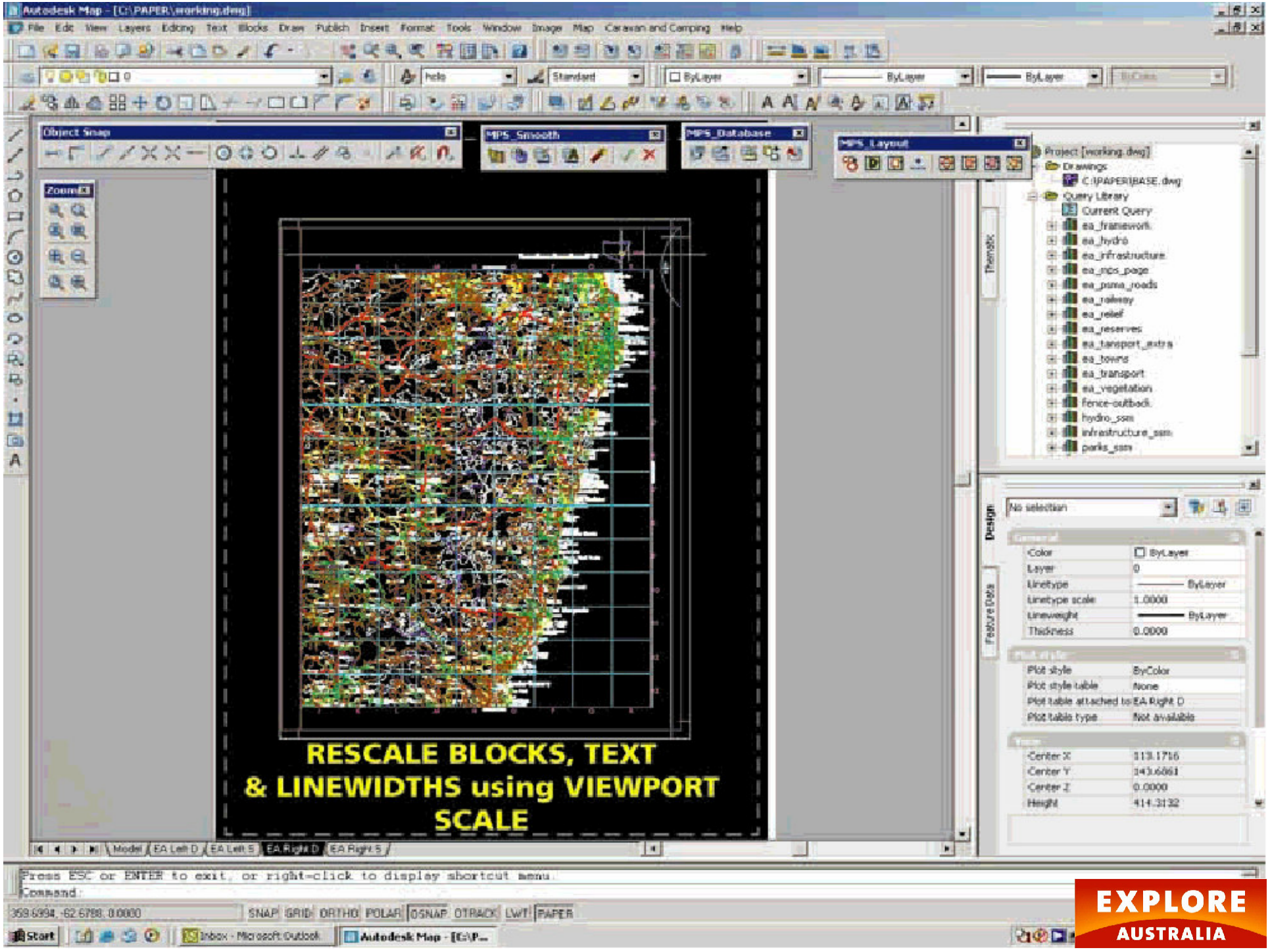
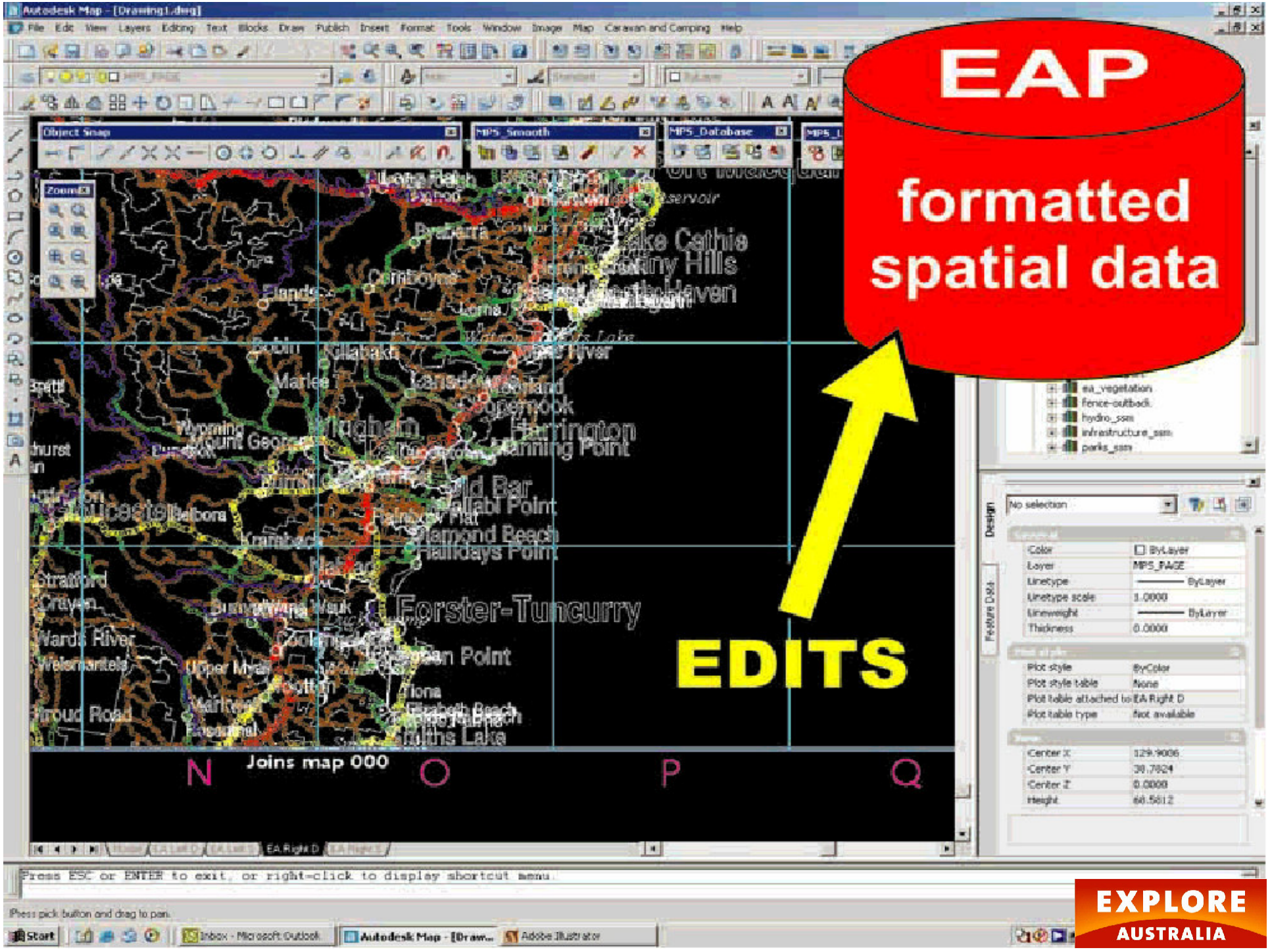

RESCALE BLOCKS, TEXT
& LINEWIDTHS using VIEWPORT
SCALE


EAP
formatted spatial data
EDITS
Joins map 000
N
O
P
Q
Forster-Tuncurry
Harrington
Manning Point
Hallidays Point
Press ESC or ENTER to exit, or right-click to display shortcut menu.
Press pick button and drag to pan.
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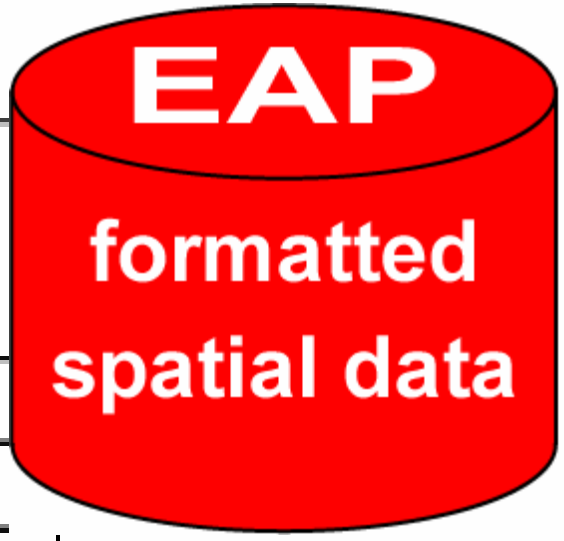
Customized workflow support data



MEDIAOD

Column Name	Column Type
BASE_EAP_UFI	VARCHAR2(255)
PUB_CODE	NUMBER
PUB_PAGE	VARCHAR2(32)
PUB_DELETE	NUMBER
USER_LAST_EDITED	VARCHAR2(32)
USER_DATE_EDITED	DATE
USER_COMMENT	VARCHAR2(255)

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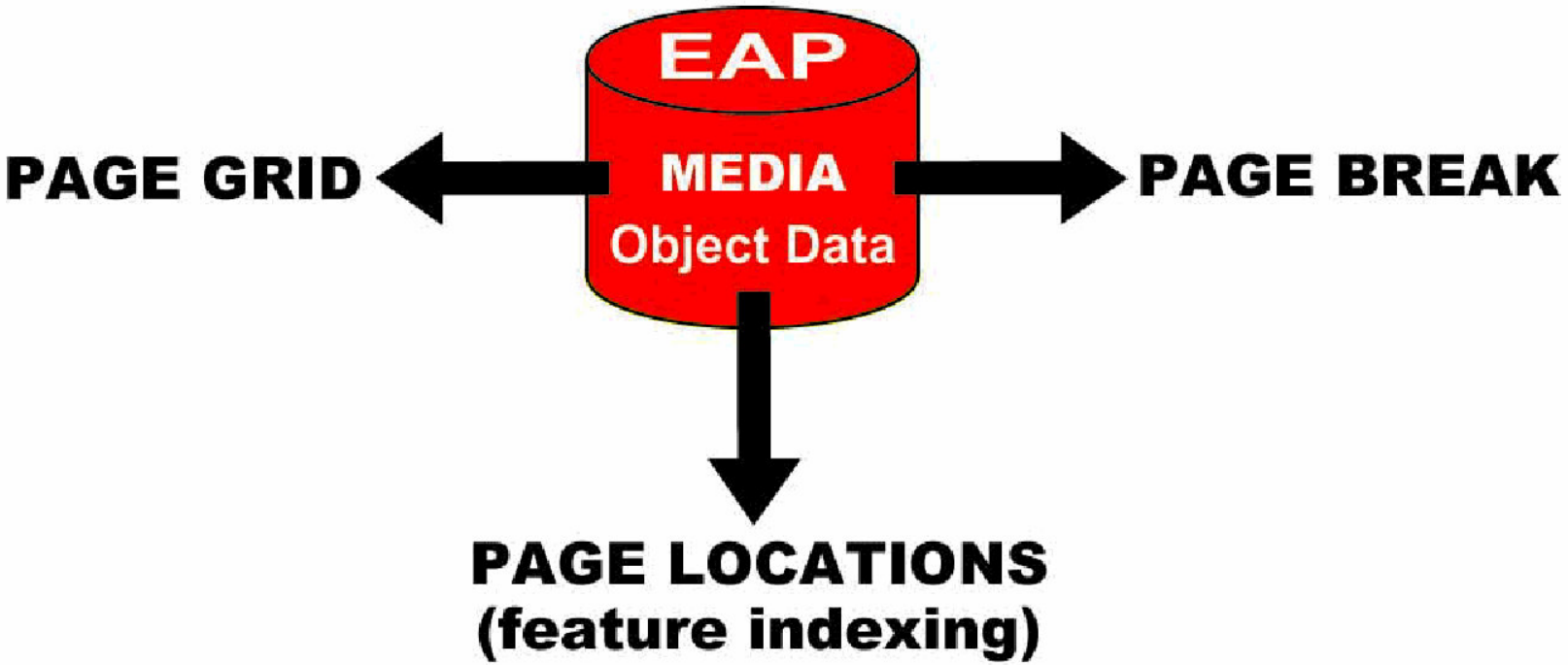
Media Object Data other functions



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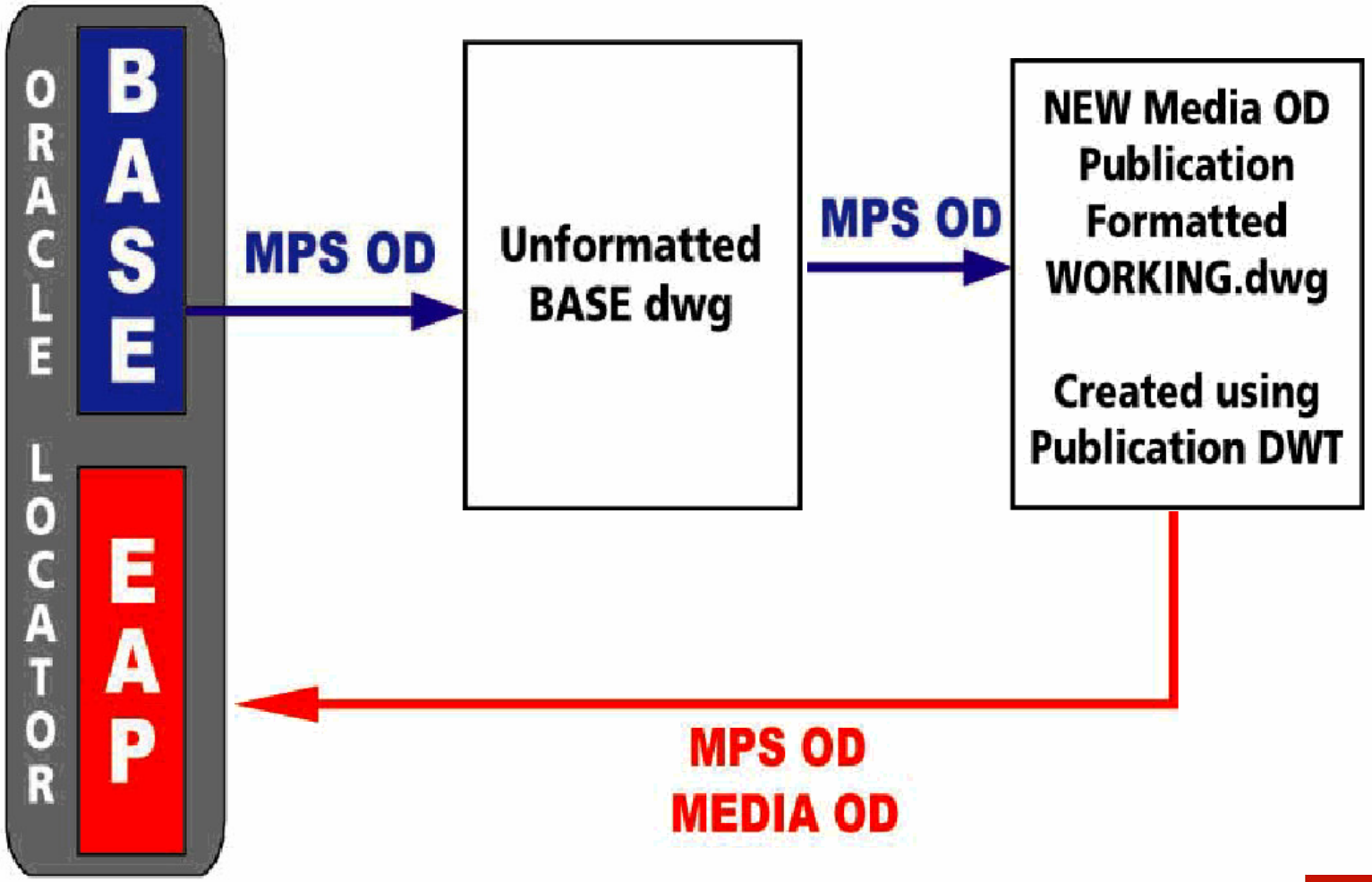
First time creation of a publication map



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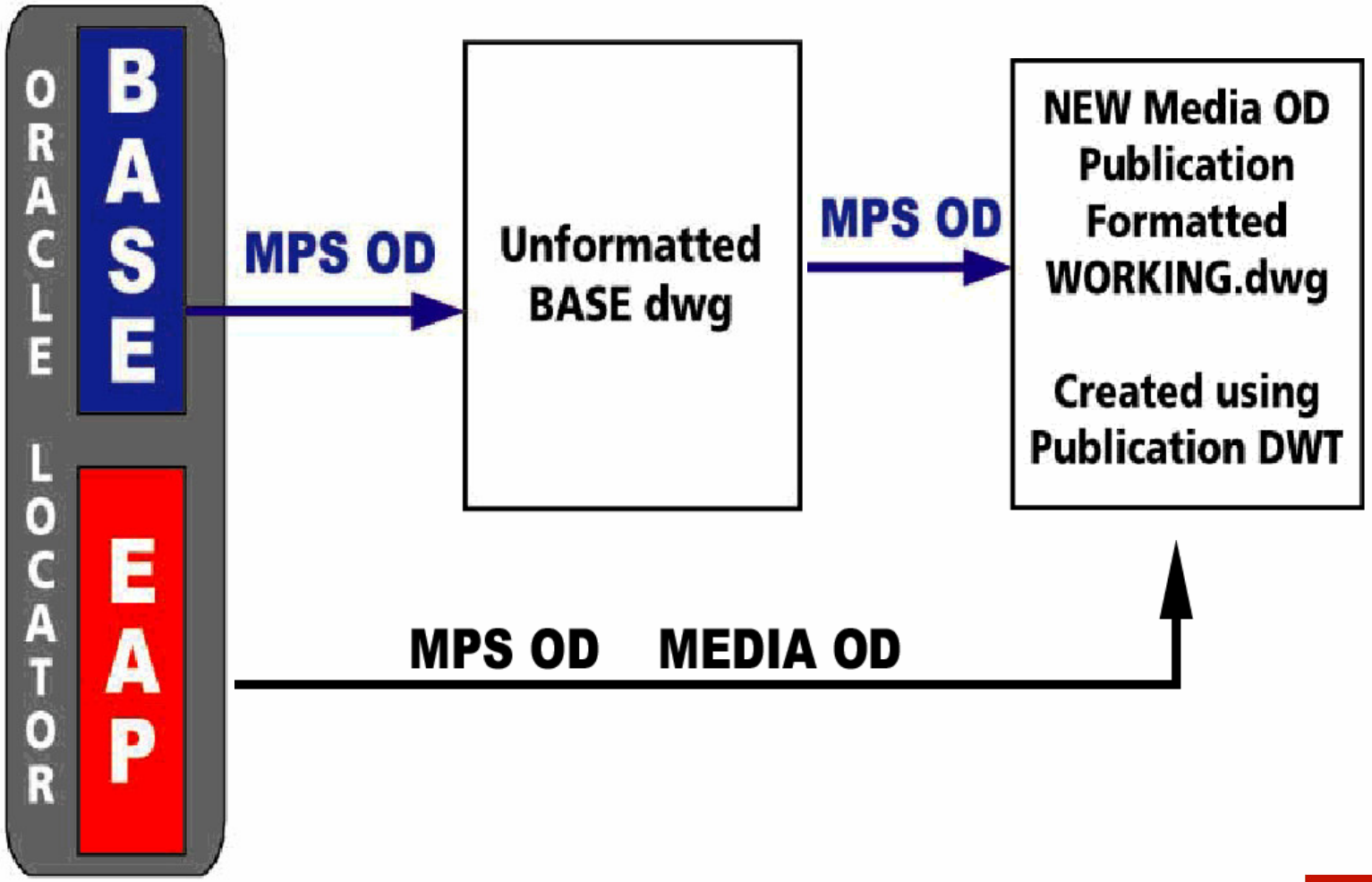
Regeneration of a publication map



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Summary of Map Production System

Data store

- Large store of geo-referenced data
- Regularly updated

Workflow model

- automated, streamlined, & efficient
- map edits stored / metadata
- re-use at later date

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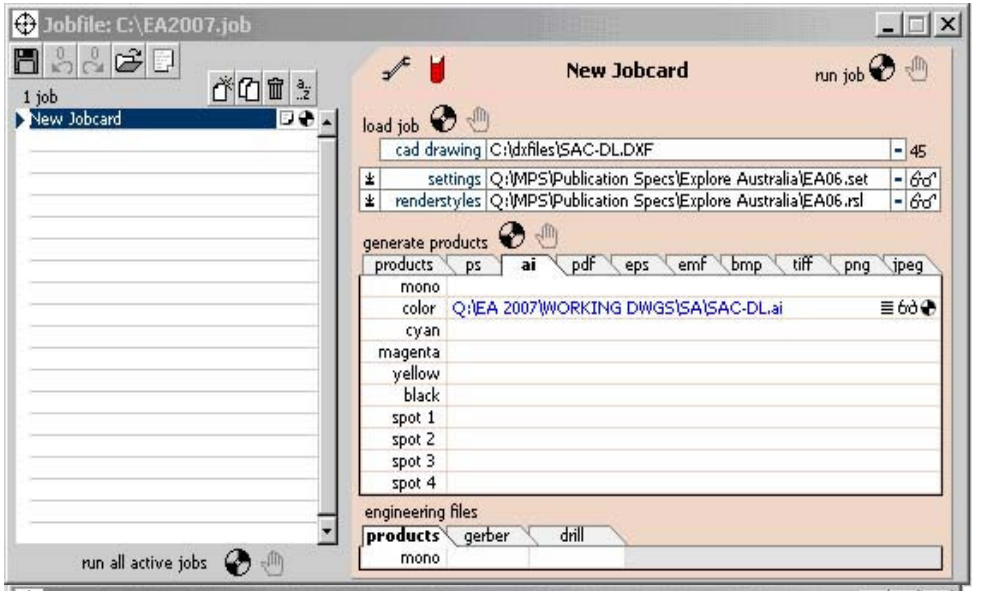
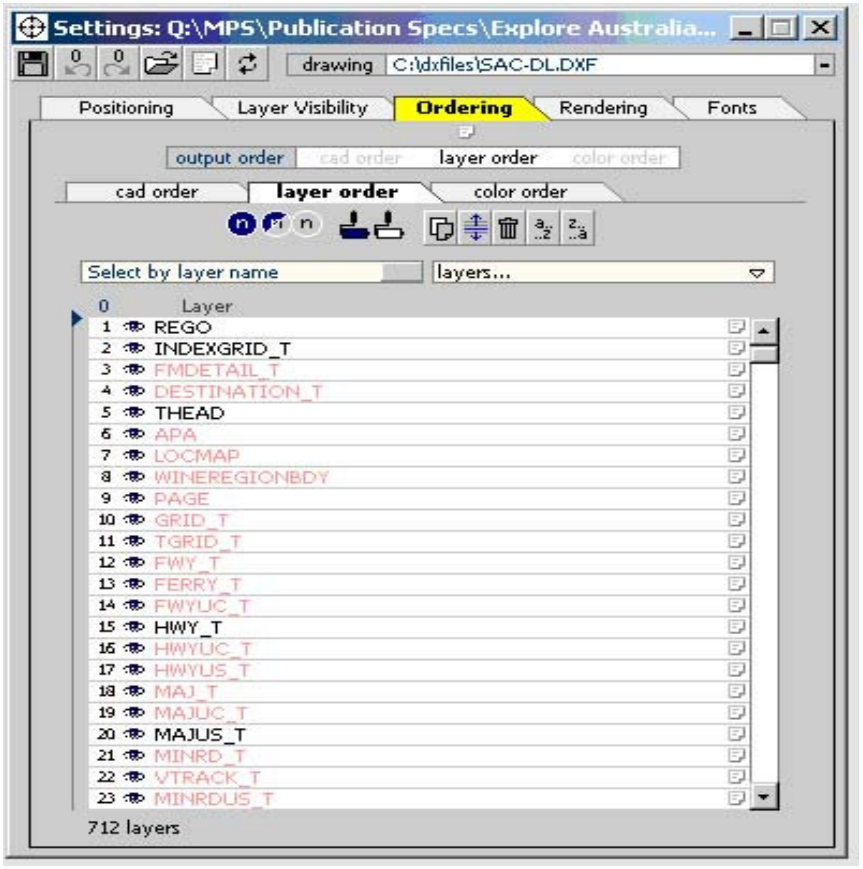
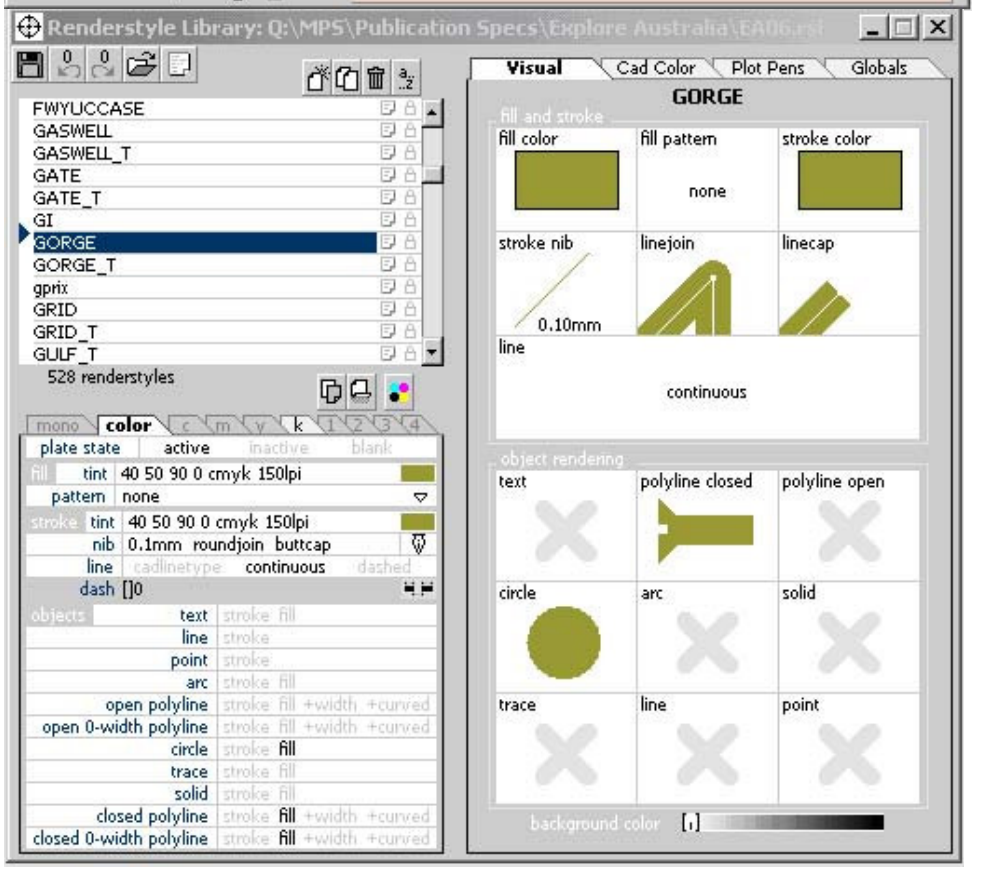
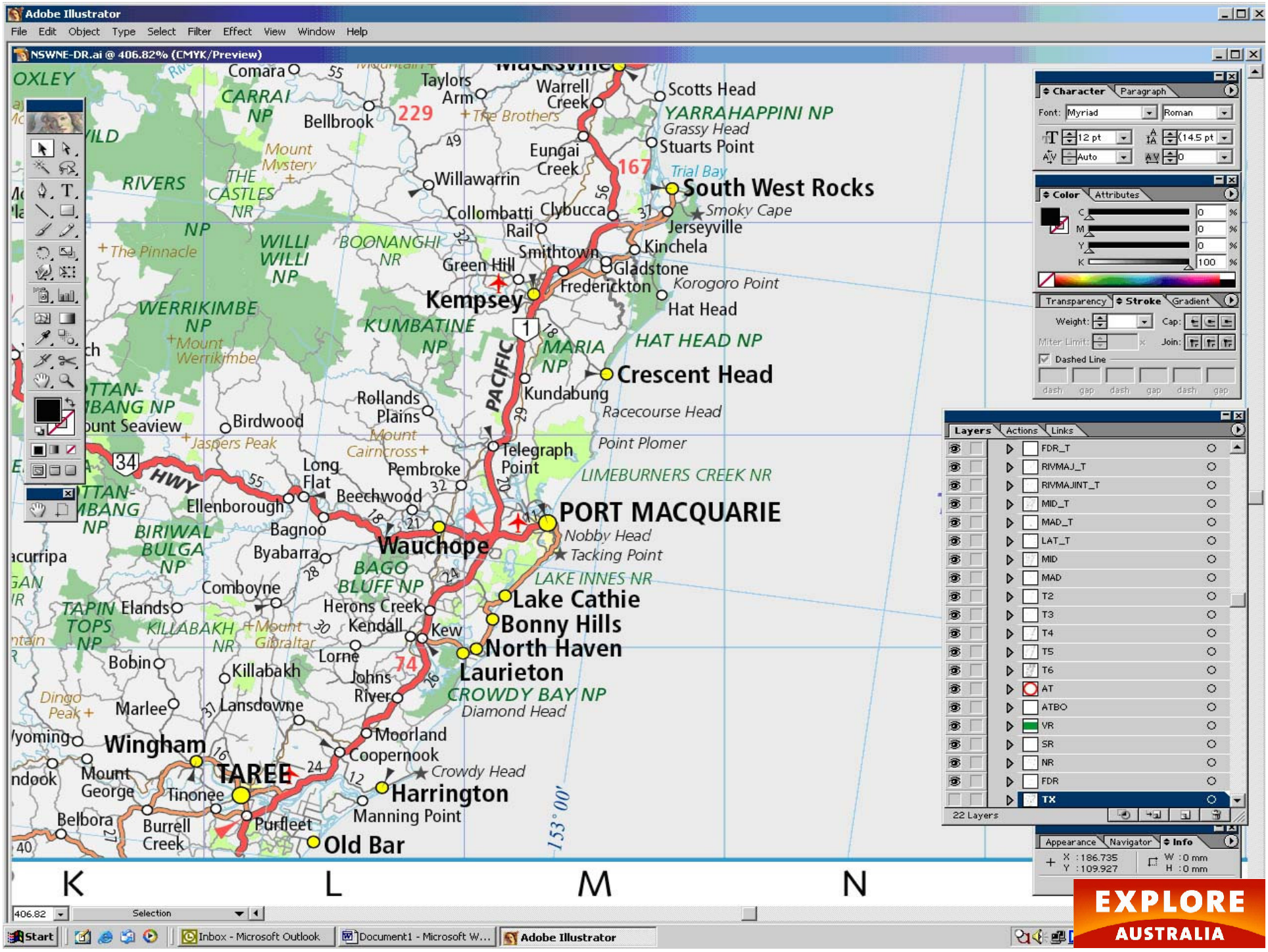
CadPublisher

- CAD to final output
- Print styles
- AI, EPS, PDF








Adobe Illustrator
File Edit Object Type Select Filter Effect View Window Help
NSWNE-DR.ai @ 406.82% (CMYK/Preview)
OXLEY
CARRAI NP
Comara
Bellbrook
229
Taylors Arm
The Brothers
Warrell Creek
Scotts Head
YARRAHAPPINI NP
Grassy Head
Stuarts Point
Trial Bay
South West Rocks
Smoky Cape
Jerseyville
Kinchela
Gladstone
Korogoro Point
Hat Head
HAT HEAD NP
Crescent Head
Racecourse Head
Point Plomer
LIMEBURNERS CREEK NR
PORT MACQUARIE
Nobby Head
Tacking Point
LAKE INNES NR
Lake Cathie
Bonny Hills
North Haven
Laurieton
CROWDY BAY NP
Diamond Head
Crowdy Head
Harrington
Manning Point
Old Bar
Eungai Creek
Willawarrin
Collombatti
Clybucca
Rail
Smithtown
Green Hill
Kempsey
Frederickton
PACIFIC
MARIA NP
Kundabung
Telegraph Point
Rollands Plains
Birdwood
Jaspers Peak
Mount Cairncross
Pembroke
Long Flat
Beechwood
Ellenborough
Bagnoo
Byabarra
Wauchope
BAGO BLUFF NP
Comboyne
Herons Creek
Kendall
Kew
Lorne
Johns River
Killabakh
Bobin
Marlee
Lansdowne
Moorland
Coopernook
Wingham
TAREE
Mount George
Tinonee
Belbora
Burrell Creek
Purfleet
Dingo Peak
Yyoming
ndook
Elands
TAPIN TOPS NP
KILLABAKH NR
Mount Gibraltar
BIRIWAL BULGA NP
WERRIKIMBE NP
Mount Werrikimbe
WILLI WILLI NP
BOONANGHI NR
KUMBATINE NP
THE CASTLES NR
RIVERS
Mount Mystery
The Pinnacle
Mount Seaview
HWY 34
167
229
1
K
L
M
N
153° 00'
Character
Paragraph
Font: Myriad
Roman
12 pt
(14.5 pt)
Auto
0
Color
Attributes
C
M
Y
K
100
Transparency
Stroke
Gradient
Weight:
Cap:
Miter Limit:
Join:
Dashed Line
dash gap dash gap dash gap
Layers
Actions
Links
FDR_T
RIVMAJ_T
RIVMAJINT_T
MID_T
MAD_T
LAT_T
MID
MAD
T2
T3
T4
T5
T6
AT
ATBO
VR
SR
NR
FDR
TX
22 Layers
Appearance
Navigator
Info
X :186.735
Y :109.927
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H :0 mm
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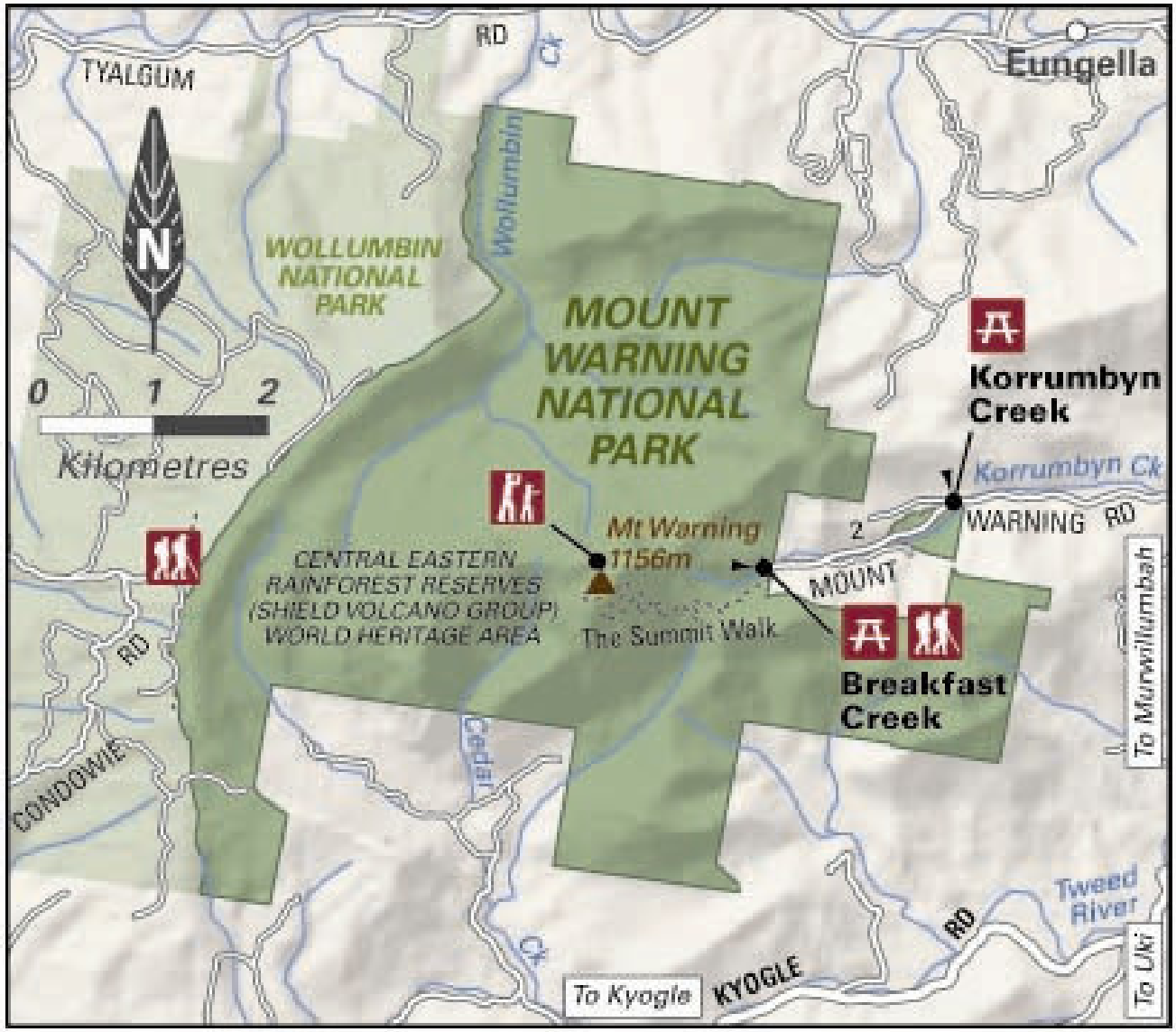
Selection
Start
Inbox - Microsoft Outlook
Document1 - Microsoft W...
Adobe Illustrator
EXPLORE AUSTRALIA


TYALGUM
RD
Eungella
Wollumbin Ck
WOLLUMBIN NATIONAL PARK
MOUNT WARNING NATIONAL PARK
N
0 1 2
Kilometres
Korrumbyn Creek
Korrumbyn Ck
WARNING RD
2
Mt Warning 1156m
CENTRAL EASTERN RAINFOREST RESERVES (SHIELD VOLCANO GROUP) WORLD HERITAGE AREA
The Summit Walk
MOUNT
Breakfast Creek
To Murwillumbah
RD
CONDOWIE
Cedar Ck
Tweed River
To Kyogle
KYOGLE RD
To Uki

Data collection along the bitumen

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Data collection in the Outback

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Benefits to the Business

- Minimal CAD learning curve
- Expanded skill base
- Years of researched data migrated into new system
- Decrease in data maintenance / increase in value adding capabilities
- Reduced production times

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Opportunities

- Now able to make a wider variety of maps - faster
- Facilitates working with external parties
- Increase in revenue

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Thank you

Bruce McGurty

EXPLORE AUSTRALIA PUBLISHING

brucemcgurty@hardiegrant.com.au

www.hardiegrant.com.au