

# TUBA User Group



## User Experience Presentation



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# Hyder User Experience



## Highways Schemes

- All assignment modelling carried out using SATURN
- Three schemes currently in progress
  - A21 Baldslow Modifications, Hastings, East Sussex
  - A421 Replacement Dual Carriageway, M1 J13 to Bedford
  - M25 North of Thames Widening
    - Section 1 J16 (M40) to J23 (M1)
    - Section 5 J23 (M1) to J27 (M11)
    - Section 4 J27 (M11) to J30 (A13)
- Demand modelling carried out using Diadem (A21) and a Regional Demand Model (EMME/2) for the M25 Widening. Fixed trip matrices derived from East of England model were used for A421.

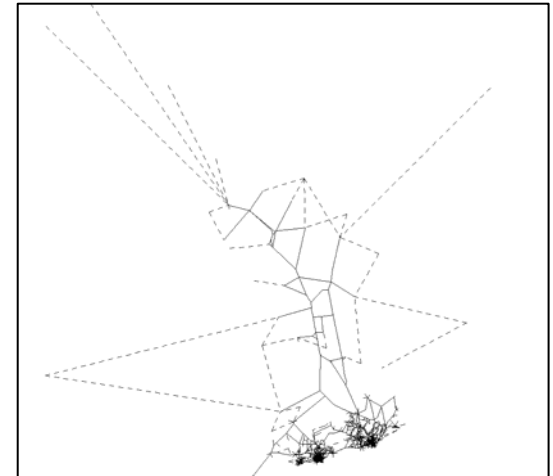
# A21 & A421 Model details

## A21

- 2 main modelled Years – 2012, 2027
- 1 User class
- 6 modelled scenarios (1 Do Minimum, 5 Do Something)
- 3 modelled periods (AM peak 8am-9am, average Inter-Peak 10am-4pm, PM peak 5pm-6pm)
- c.250 zones
- DIADEM used for producing variable trip matrices

## A421

- 4 modelled years – 2011, 2012, 2018, 2026
- 2 User classes – Lights (Cars, LGVs) and HGV
- 2 modelled scenarios (Do Minimum, Do Something)
- 7 modelled periods (AM peak + 2 shoulder periods, average Inter-Peak 10am-4pm, PM peak + 2 shoulder periods)
- 167 zones
- Fixed trip assignment only using different Do Minimum & Do Something matrices



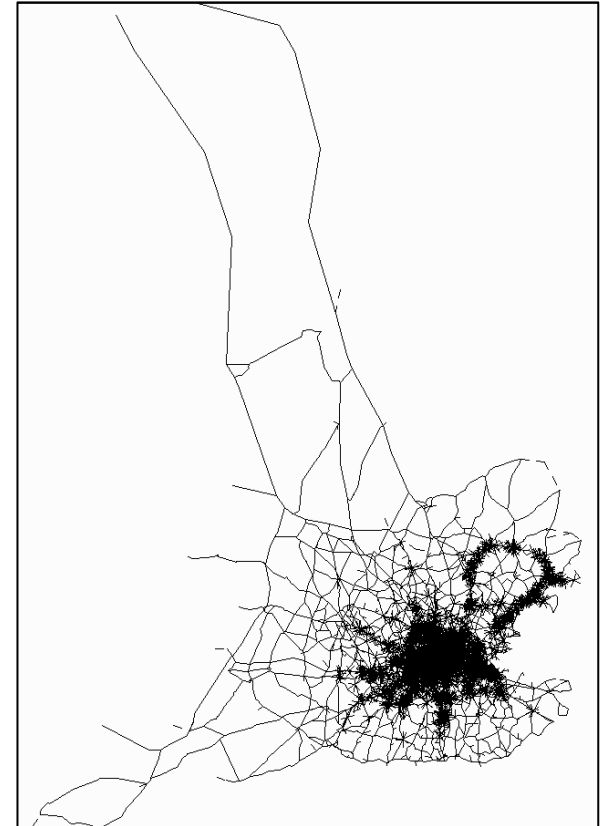
# M25 Model details

## Main Forecasts

- 5 main modelled Years – 2012, 2015, 2021, 2027, 2030
- 5 User classes – Car (Business, Commuting, Other), LGV, HGV
- 10 modelled scenarios (Do Minimum, Do Something, and eight in between!)
- 3 modelled periods (AM peak 8am-9am, average Inter-Peak 10am-4pm, PM peak 5pm-6pm)
- 971 zones
- Fixed trip, then demand model run, then variable trip assignment
- Model run times – don't ask!

## Construction Forecasts (including phased opening)

- 2 modelled years – 2010 (Sections 1 & 4), 2013 (Section 5 including Section 2)
- 2 User classes – Lights (Cars, LGVs) and HGV
- 20 modelled phases (s1 & s4); 15 modelled phases (s5)
- Fixed trip assignment only



# TUBA run information

- All three models use the Standard Economics File
- We run with a single BAT & TXT where possible, otherwise employing a separate BAT & TXT for each user class

USER_CLASSES			
*no.	Veh/submode	purpose	person_type
1	1	1	0
2	1	2	0
3	1	3	0
4	2	3	0
5	3	1	0
6	4	1	0
7	5	1	0

INPUT_MATRICES							
*no.	userclasses	timeslice	type	format	scenario	year	factor filename
1	6	1	V	2	0	2012	D:\Satwin\TUBA\Dem-TgCon_postrdm\FrDM_12MaTgCon_UC5_V.CSV
2	6	2	V	2	0	2012	D:\Satwin\TUBA\Dem-TgCon_postrdm\FrDM_12MiTgCon_UC5_V.CSV
3	6	3	V	2	0	2012	D:\Satwin\TUBA\Dem-TgCon_postrdm\FrDM_12MpTgCon_UC5_V.CSV

- GRP files are used to run user classes in sequence
- Run times vary from a few seconds for A21 & A421 models up to 3½ hours for each M25 DM-DS pairing
- We import OUT files into Excel for combining user classes and export data to CSV for loading into Access for detailed querying



## TUBA – Making life easier

TUBA performs well and is reasonably robust but there are a number of areas where the program might be improved to make user life easier, or provide additional information useful for answering the questions we often get asked. Our comments and suggestions are grouped into four topic areas:

- Greenhouse gases
- Matrices
- Data export
- Calculation detail

# TUBA – Making life easier

## Greenhouse gases



CARBON_EMISSION														
Submode	Year	Emissions (tonnes)			cost (£000s, low)			cost (£000s, central)			cost (£000s, high)			
		DM	DS	Increase	DM	DS	Increase	DM	DS	Increase	DM	DS	Increase	
Car	2012	1779571	1781348	1777	61375	61437	61	107070	107177	107	198471	198669	198	
Car	2015	1771781	1773256	1475	58632	58681	49	99666	99748	83	181743	181894	151	
Car	2021	1790772	1792673	1901	53993	54051	57	87732	87825	93	155217	155382	165	
Car	2030	1886166	1886669	503	48432	48445	13	74506	74526	20	126660	126694	34	
AI I	2012	1779571	1781348	1777	61375	61437	61	107070	107177	107	198471	198669	198	
AI I	2015	1771781	1773256	1475	58632	58681	49	99666	99748	83	181743	181894	151	
AI I	2021	1790772	1792673	1901	53993	54051	57	87732	87825	93	155217	155382	165	
AI I	2030	1886166	1886669	503	48432	48445	13	74506	74526	20	126660	126694	34	
Car	Total	111654162	111701718	47557	2424322	2425520	1199	3674831	3676724	1894	6176188	6179472	3284	
AI I	Total	111654162	111701718	47557	2424322	2425520	1199	3674831	3676724	1894	6176188	6179472	3284	

- WebTAG specifies that greenhouse gas data is required every year for 60 years – presently only data is available for the modelled years and we've yet to satisfactorily interpolate to match the reported totals.
- Our suggestion is that GHG data is added to the detailed export facility.
- Our air quality modellers request data for the full 8760 hours in a year, yet we mainly assess other benefits over 12 hours Monday to Friday only.
- Our suggestion is that separate annualisation factors for greenhouse gases be added to avoid the need for separate TUBA runs solely for this aspect.

# TUBA – Making life easier

## Matrices (1)



INPUT_MATRICES									
*no.	userclasses	timeslice	type	format	scenario	year	factor	filename	
1	4	1	V	2	0	2015	0.12000	D:\Satwin\TUBA\Dem-TgCon_postrdm\FdDS-s5_15MaVTgCon_UC4_V.CSV	
2	4	2	V	2	0	2015	0.12000	D:\Satwin\TUBA\Dem-TgCon_postrdm\FdDS-s5_15MiVTgCon_UC4_V.CSV	
3	4	3	V	2	0	2015	0.12000	D:\Satwin\TUBA\Dem-TgCon_postrdm\FdDS-s5_15MpVTgCon_UC4_V.CSV	
4	4	1	D	2	0	2015	0.00100	D:\Satwin\TUBA\Dem-TgCon_postrdm\FdDS-s5_15MaTgCon_UC4_D.CSV	
5	4	2	D	2	0	2015	0.00100	D:\Satwin\TUBA\Dem-TgCon_postrdm\FdDS-s5_15MiTgCon_UC4_D.CSV	
6	4	3	D	2	0	2015	0.00100	D:\Satwin\TUBA\Dem-TgCon_postrdm\FdDS-s5_15MpTgCon_UC4_D.CSV	
7	4	1	T	2	0	2015	0.00028	D:\Satwin\TUBA\Dem-TgCon_postrdm\FdDS-s5_15MaTgCon_UC4_T.CSV	
8	4	2	T	2	0	2015	0.00028	D:\Satwin\TUBA\Dem-TgCon_postrdm\FdDS-s5_15MiTgCon_UC4_T.CSV	
9	4	3	T	2	0	2015	0.00028	D:\Satwin\TUBA\Dem-TgCon_postrdm\FdDS-s5_15MpTgCon_UC4_T.CSV	
10	4	1	V	2	1	2015	0.12000	D:\Satwin\TUBA\Dem-TgCon_postrdm\FdDS_15MaTgCon_UC4_V.CSV	
11	4	2	V	2	1	2015	0.12000	D:\Satwin\TUBA\Dem-TgCon_postrdm\FdDS_15MiTgCon_UC4_V.CSV	
12	4	3	V	2	1	2015	0.12000	D:\Satwin\TUBA\Dem-TgCon_postrdm\FdDS_15MpTgCon_UC4_V.CSV	
13	4	1	D	2	1	2015	0.00100	D:\Satwin\TUBA\Dem-TgCon_postrdm\FdDS_15MaTgCon_UC4_D.CSV	
14	4	2	D	2	1	2015	0.00100	D:\Satwin\TUBA\Dem-TgCon_postrdm\FdDS_15MiTgCon_UC4_D.CSV	
15	4	3	D	2	1	2015	0.00100	D:\Satwin\TUBA\Dem-TgCon_postrdm\FdDS_15MpTgCon_UC4_D.CSV	
16	4	1	T	2	1	2015	0.00028	D:\Satwin\TUBA\Dem-TgCon_postrdm\FdDS_15MaTgCon_UC4_T.CSV	
17	4	2	T	2	1	2015	0.00028	D:\Satwin\TUBA\Dem-TgCon_postrdm\FdDS_15MiTgCon_UC4_T.CSV	
18	4	3	T	2	1	2015	0.00028	D:\Satwin\TUBA\Dem-TgCon_postrdm\FdDS_15MpTgCon_UC4_T.CSV	

- The full path of each matrix is specified. We often need to switch runs between computers which have different drive letters and folder structures. This means we have to change every line in the matrix table.
- Our suggestion is that path names be specified separately (we suggest more than one) and a path number be allocated to each file.

# TUBA – Making life easier

## Matrices (2)



- TUBA format checks each matrix file in order, checking first that it is present. If we've got a path wrong, substantial time is spent checking the format of other matrix files first.
- Our suggestion is that TUBA checks that all matrix files exist first before proceeding to check their format.
- In TUBA runs based on fixed trip assignments, the same matrix may be specified more than once. TUBA will read and check its format each time the file is specified.
- Our suggestion is that TUBA maintains a list of matrix files for which it has completed the format check so that it can skip the check if it encounters the a matrix in the list for a second or subsequent time.
- TUBA requires all matrix lines to be numbered sequentially from 1. If we delete an entire modelled year, we have to renumber all subsequent lines.
- Our suggestion is that a facility is offered to automatically (or upon prompt) renumber lines if a gap is found.

# TUBA – Making life easier



## Data Export

- We use the GRP file facility to batch run our TUBAs, yet we have to export the detailed data individually for each TUBA run.
- Our suggestion is that a batch export facility is added
- Currently we use the export facility with all combo boxes set to the default 'All (segregated)' setting. Often we don't need the data fully segregated.
- Our suggestion is that an 'All (combined)' option is added to each combo box.
- After starting an export, TUBA deactivates the export window and apparently 'hangs'.
- Our suggestion is that a pop-up progress box is shown while the export is in progress.

# TUBA – Making life easier



## Calculation Detail

- On the M25 project, our matrix size (971 x 971) is too large to record every zone as a sector for detailed analysis. We combine our zones into 61 sectors. This means we cannot look at zone to zone figures.
- Related to this, we are increasingly getting asked for detail on individual calculations for zone to zone movements. Again we are unable to provide a satisfactory answer.
- Our suggestion is that an optional facility is added to TUBA which outputs to a text (or CSV) file the numbers used for each calculation (including the values drawn from the economics file) and the result, perhaps on a selective basis (e.g. Non-fuel VOCs). We could then examine the data required by scanning the file created.

# TUBA User Group – Hyder User Experience



## Summary

- Hyder use TUBA extensively on Highways Agency projects
- Our use covers ‘typical’ projects as well as the M25 mega-project
- The greenhouse gas calculations and lack of available detail to comply with WebTAG requirements affect all our projects
- Use of TUBA on the M25 project has pushed it towards its limits and, with support from Mott MacDonald, we’ve achieved satisfactory program operation
- We’ve identified a number of suggestions for improving program performance and reduce our frustrations
- De-mystifying some of the ‘blackbox’ calculations performed within TUBA would assist us in responding to questions