Delivering Strategies

Broxbourne Transport Modelling

Report for Broxbourne Borough Council

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mvaconsultancy

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1 Introduction and context

1.1 Context

1.1.1 The Spatial Vision for Broxbourne over the next 20 years together with the spatial strategies of adjoining authorities will create additional travel demands within and across the Borough. Whilst policies to manage demand and promote sustainable travel should help keep traffic growth in check there will inevitably be a net increase in vehicular traffic.

1.1.2 In order to assess the scale of the potential impacts and any requirements for mitigating measures, Broxbourne Borough Council (BBC) appointed MVA Consultancy to undertake a strategic transport modelling exercise for the Borough. This was specifically in response to comments made by a mock Planning Inspector during a recent LDF advisory visit that "Infrastructure issues, particularly highway matters, need to be as fully resolved as possible in order to show that proposals can be realistically delivered."

1.1.3 The exercise scoped out by BBC and undertaken by MVA Consultancy has sought to provide evidence to support the Core Strategy in the following ways:

- identify additional likely traffic flows as a result of various Core Strategy development scenarios;
- determine whether the highway network has sufficient capacity to accommodate none/some/all of the Core Strategy development scenarios;
- identify the point at which individual roads / junctions may reach their finite capacity;
- identify where improvements may be necessary to accommodate increased traffic flows; and
- identify any sustainable transport measures which could be implemented.

1.1.4 This Report provides a detailed summary of the study's methodology, analysis, results and conclusions. The 'big messages' relating to delivering the Core Strategy are highlighted, in particular any potential interventions required to the highway network.

1.1.5 The results, analysis and conclusions presented in this Report do necessarily focus on highway impacts, and in particular on car use. However this Report also considers development impacts in a wider perspective with greater focus on planning approaches that reduce the need to travel and on maximising the opportunities for travel by public transport, on foot or by bicycle.

1.2 Report structure

1.2.1 This Report is structured as follows:

- Chapter 2 – study methodology;
- Chapter 3 – definition of scenarios and packages;
- Chapter 4 – future highway network performance and 'stress';
- Chapter 5 – possible interventions; and
- Chapter 6 – study conclusions.

2 Methodology

2.1 Overview

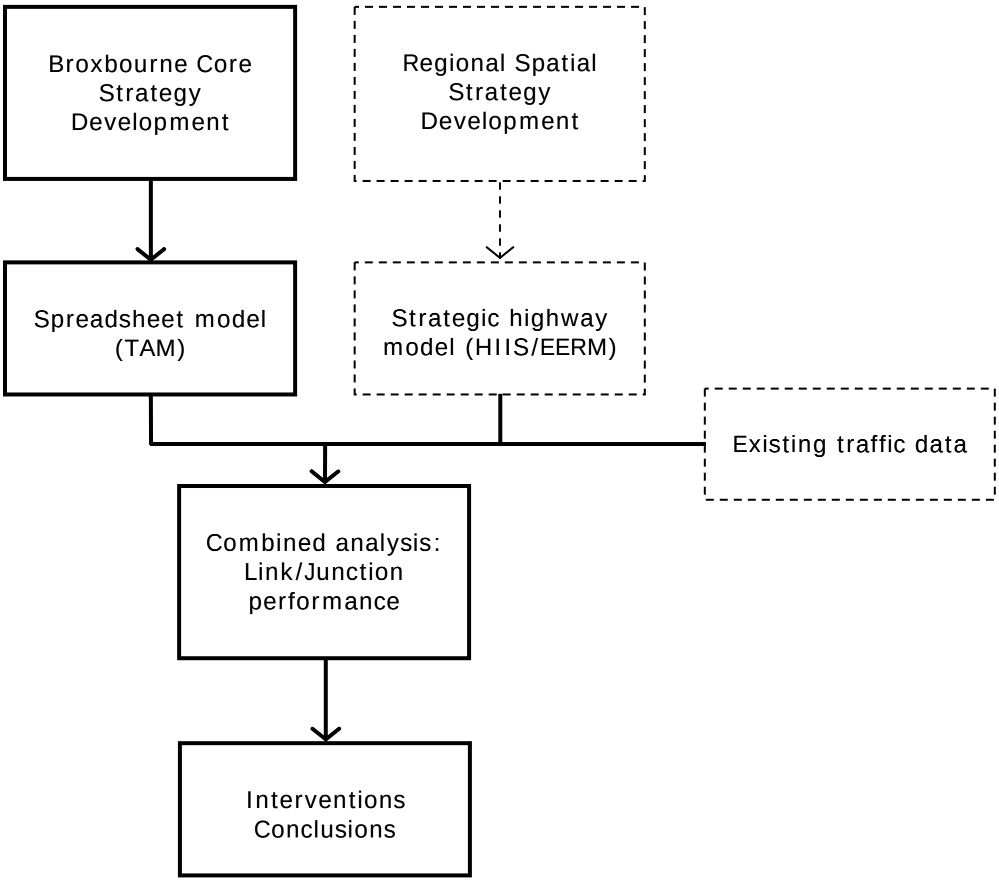
2.1.1 An established and robust methodology has been adopted by MVA Consultancy in order to assess the transport implications of BBC's Core Strategy and associated development options. Hertfordshire County Council, in its capacity as the local Highway Authority, has taken an active role in ensuring that the study methodology is sound and that the outputs are credible and robust for the purposes of supporting the Core Strategy.

2.1.2 The methodology developed for the study comprises three key components:

- a **spreadsheet model** that is used to assess BBC's Core Strategy development;
- a **strategic highway model** that has been developed by the Highways Agency to consider the impact of regional growth and development; and
- a **combined analysis model** that incorporates outputs from the two models above, plus existing traffic data.

2.1.3 The methodology is illustrated below in Figure 2.1 as a simplified flowchart – with bold elements representing MVA analysis and dotted elements representing prior work undertaken by others.

Figure 2.1 Methodology flowchart



2.1.4 Each of the component models is considered in more detail in subsequent sections.

2.2 Spreadsheet model

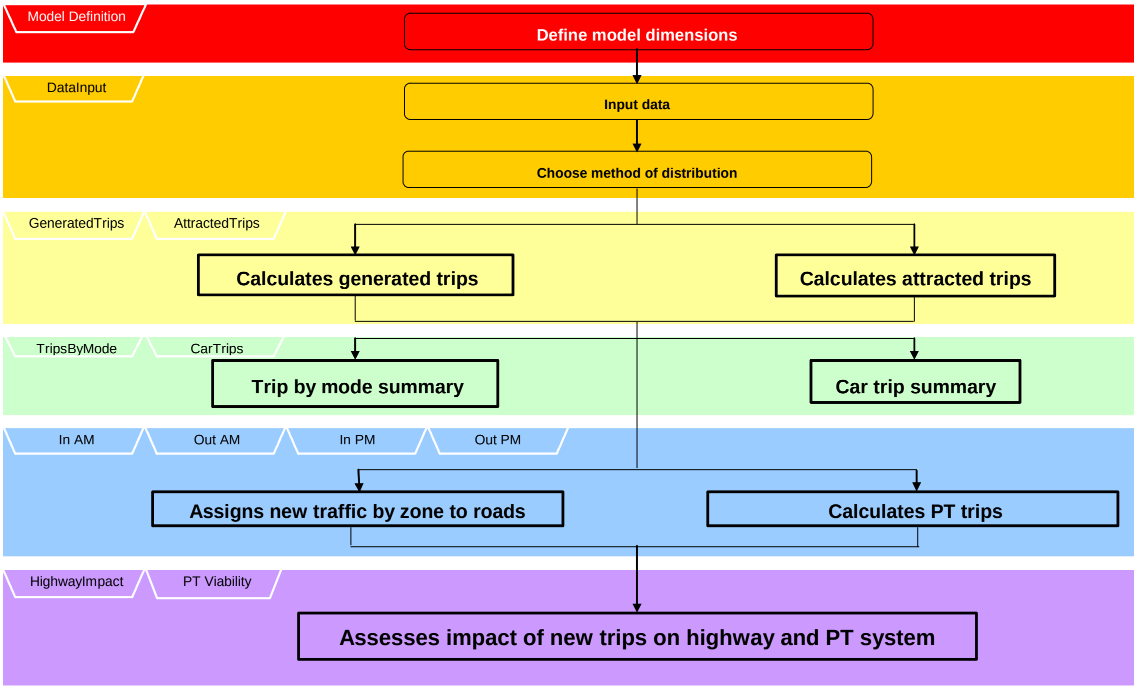
2.2.1 The tight timescale of the study precluded the development of a traditional strategic transport model. Instead a spreadsheet based approach has been used to provide sufficient high-level information on development impacts to enable assessment of Core Strategy options, including cross-comparisons between different scenarios.

2.2.2 MVA Consultancy's Transport Assessment Model (TAM) is a spreadsheet-based approach to conventional four-stage modelling, which considers all the variables leading from changes in land use, through the generation of new or additional trips, to where on the network journeys are made. The model explicitly considers the following:

- **Trip Generation** – how many trips are made by a development – dependent on land use, quantum, and location;
- **Trip Distribution** – where these trips start/finish – both within the Borough, surrounding Authorities, and also more strategically;
- **Trip Mode Share** – what transport mode these trips are made on – car, public transport (bus / rail), cycle, or walk; and
- **Trip Assignment** – which roads and junctions as used by those trips made by car.

2.2.3 The model considers both 'generated' trips (ie residential development) and also 'attracted' trips (ie office, commercial, leisure development). Development floorspace data is input directly into TAM allowing scenario tests to be developed and tested. The model's flexibility has been used to examine multiple development phases, journey purposes, and socio-economic factors from readily available national and local data sources.

Figure 2.2 Structure of MVA's Transport Assessment Model (TAM)



2.3 TAM – Key inputs

2.3.1 Key inputs into the model are:

- development quantums (residential units, B1/B8/etc land uses);
- trip rates (TRICS, National Travel Survey + 'Focus on Personal Travel');
- distribution profiles (Gravity modelling, Census Journey to Work data);
- mode share assumptions (Census Journey to Work data, schools data); and
- highway assignment assumptions (including congestion / rat-running).

2.3.2 Different Core Strategy development scenarios are modelled by changes to the following inputs:

- different development land use mix, development quantum, development location;
- different trip distribution profiles – mostly influenced by development location;
- different mode share assumptions – influenced by development land use and location; and
- different highway assignment routings / assumptions.

Time periods and modelled years

2.3.3 Two time periods have been modelled in TAM – an AM peak period represented by 8-9am and a PM peak period represented by 5-6pm.

2.3.4 Development phasing has not been explicitly modelled in TAM. Each Core Strategy development scenario has been tested at 100% build-out which is assumed to be, in isolation from background and RSS growth, year unspecific. [The combined analysis model is the point at which different forecast years are tested.]

Double counting

2.3.5 The TAM modelling work has adopted a conservative approach to trip generation. All development proposed in each of the Core Strategy scenarios is assumed to be entirely new (greenfield sites). In some instances it is likely that there are existing development sites (brownfield) which currently generate trips that should be 'netted off'. No netting off has been undertaken for this study – all sites are assumed to be greenfield.

2.3.6 Furthermore, in the case of residential development, it is assumed that the new dwellings constructed are filled with new residents to the Borough (at existing occupancy rates). The decreasing trend in household occupancy is predicted to continue and so, in reality, it might be expected that the new dwellings being constructed may include residents who are already living in the Borough – and thus already making journeys on the highway network.

2.3.7 Incorporating both of these assumptions in TAM ensures that the modelling work is robust and presents a 'worst case' in terms of trip generation, highway network flows, and ultimately impact. Additional sensitivity tests could be conducted to refine these assumptions if required.

2.4 TAM – Key outputs

2.4.1 Key TAM outputs include:

- development quantums by stage;
- trip rates by land use;
- total number of 'person trips' generated by each development parcel;
- distribution patterns and model zone plan;
- mode share assumptions;
- summaries of total person trips and total car trips by stage;
- development-related traffic flows for each link on the local transport network; and
- traffic flow plots depicted on a schematic local road network.

2.5 TAM Stage 1 – Trip Generation

2.5.1 This first stage of the model calculates peak period **person** trip rates for each land use, by journey purpose and therefore the total number of person trips generated and attracted to/from the study area during peak periods.

2.5.2 Depending on land use, trip generation is modelled in TAM using one of two methodologies. Residential development is modelled using a 'first principles' approach whilst employment and other land uses are based on a trip rate methodology.

Residential

2.5.3 The 'first principles' approach used for residential development calculates person trips by applying a number of assumptions:

- population per dwelling (Census data); multiplied by
- total trips made per person per year ('Focus on Personal Travel' document); divided by
- car trip occupancy (split by journey purpose); factored by
- socio-economic profiles ('Focus on Personal Travel' document); multiplied by
- weekday/weekend trip proportions and AM/PM peak hour proportions ('Focus on Personal Travel' and 'National Travel Survey' documents).

Employment

2.5.4 For non-residential land uses, person trip rates were obtained through two sources:

- interrogation of the national TRICS database for a variety of different land uses to give estimates of multi-modal trip rates per 100m^2; and
- previous Transport Assessments (eg Brookfield) – generally used as a check for the above.

2.5.5 Residential and other land use trip rates are provided in Appendix 1.

2.6 TAM Stage 2 – Trip Distribution

2.6.1 The second stage of the model requires the definition of zones that reflect existing and likely future spread of population and jobs. The generated and attracted trips (as calculated in the first stage of the model) are then apportioned to these zones according to land use.

2.6.2 The following data sources have been used to provide inputs into the model:

- Hertfordshire County Travel Survey;
- census ward population data; and
- census ward employment data (using the 'Journey to Work' dataset as a proxy for this).

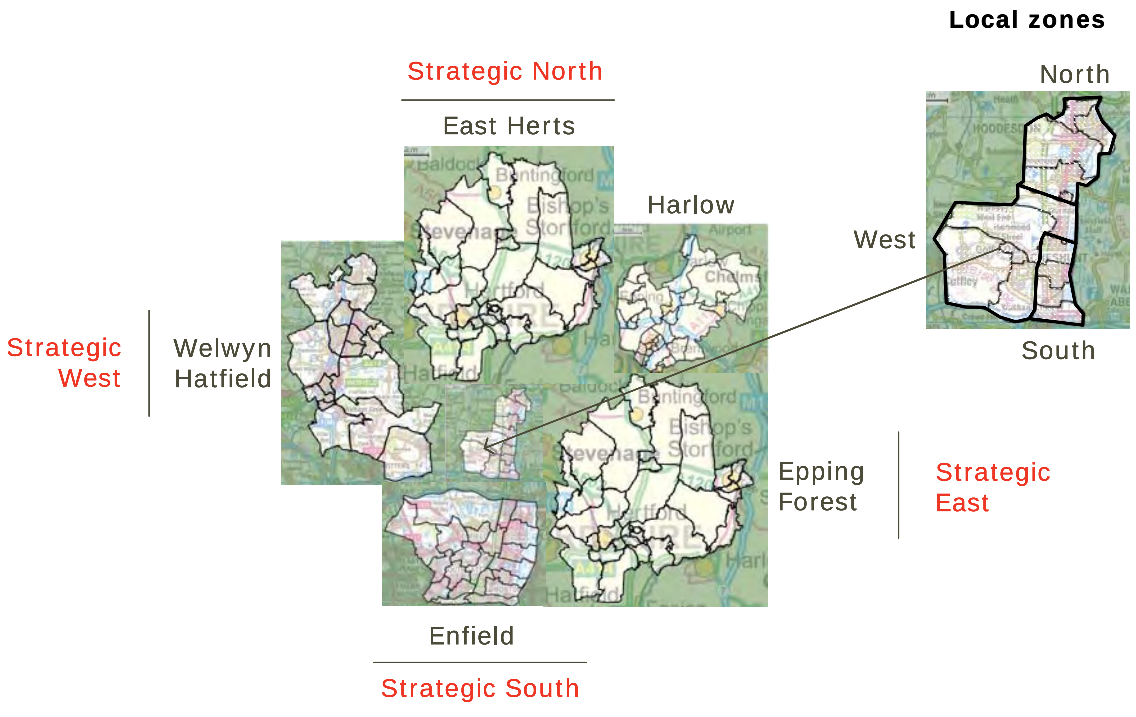
Zoning

2.6.3 A three-level zoning systems has been created:

- external 'strategic' zones representing the major destinations surrounding the Borough (north, south, east, west);
- neighbouring zones representing adjoining authorities (East Herts, Harlow, Epping Forest, Enfield, Welwyn Hatfield); and
- local zones which represent indicative sub-areas of Broxbourne borough.

2.6.4 Figure 2.3 below illustrates the three-level hierarchy of the zoning system.

Figure 2.3 Trip distribution – model zones



Distribution

2.6.5 The splitting of generated trips to each of the model zones was done using data obtained from the 2001 Census Journey to Work dataset. Using the full UK dataset, all trips starting or finishing in each of the Borough's OAs were identified and then aggregated to the TAM zoning system. Different proportions were therefore calculated for outbound (home>work; AM) and inbound (work>home; PM) trips.

2.6.6 A 'sense-check' of the results was undertaken by creating an alternative distribution profile that is synthetically produced using a gravity-style calculation. This gravity approach is based on a conventional P/D^2 relationship (where P = residential or employment population of zone; D = distance/time between development site and zone). The sense check confirmed that the distribution profile extracted from the Journey to Work dataset was reasonable and sufficiently robust for use in TAM.

2.6.7 An additional dataset made available to MVA was the Hertfordshire County Travel Survey. The survey was analysed to see whether it could be used as an additional source of data to inform trip distribution. Unfortunately the sample size for trips made during the peak periods to/from Broxbourne was too small to be used reliably.

2.6.8 Trip distribution profiles are provided in Appendix 2.

2.7 TAM Stage 3 – Trip Mode Share

2.7.1 Having calculated the number of person trips and where they start/finish, the mode share stage of the model then splits the trips into discrete modes (ie car, bus, rail, walk, cycle). The mode of travel used will differ by distance and destination (a function of the availability of a public transport option), and also by land use (residential 'outbound' versus employment 'inbound' trips may vary).

2.7.2 Data sources used to create mode share profiles include:

- Census 2001 data (including the 'Journey to Work' dataset);
- previous technical reports (eg Transport Assessments);
- qualitative information on current and proposed highway and public transport conditions, schemes and interventions..

2.7.3 Current 'base' year mode shares are calculated using the Census Journey to Work dataset. Again, these shares have been checked against previous assumptions in other Transport Assessments supplied to MVA. As described in 2.5.7 the County Travel Survey could have been a useful complementary data source but sample sizes were too small too be reliable.

2.7.4 The final mode share data was produced by time period and by model zone – with a manual check undertaken to filter out odd results (eg long walk trips, trips by public transport to destinations with no provision).

2.7.5 The base year mode shares have been left unchanged in the future year modelling work. This is therefore assuming that there is no future change in transport infrastructure provision, travel behaviour, or other factors that could influence mode share.

2.7.6 Considerations such as a modal shift from car to bus as a result of improved public transport, a modal shift from car to walk/cycle as a result of an improved street environment and better integration of land uses, and a modal shift from car to public transport (bus and rail) from travel demand management measures (including but not exclusively car parking policies) have not been considered. This ensures a conservative approach is taken whereby the impacts and interventions in latter Chapters are presented as 'worst case' scenarios which could be improved by consideration of the factors above using amended mode shares.

2.7.7 Trip mode share profiles are provided in Appendix 3.

2.8 TAM Stage 4 – Trip Assignment

2.8.1 Trip assignment has been undertaken in TAM at two levels. At first, a simple assignment process was undertaken in order to provide headline results to the Client team. This was then re-visited with a more detailed approach taken that considered individual assignment paths and multiple routing.

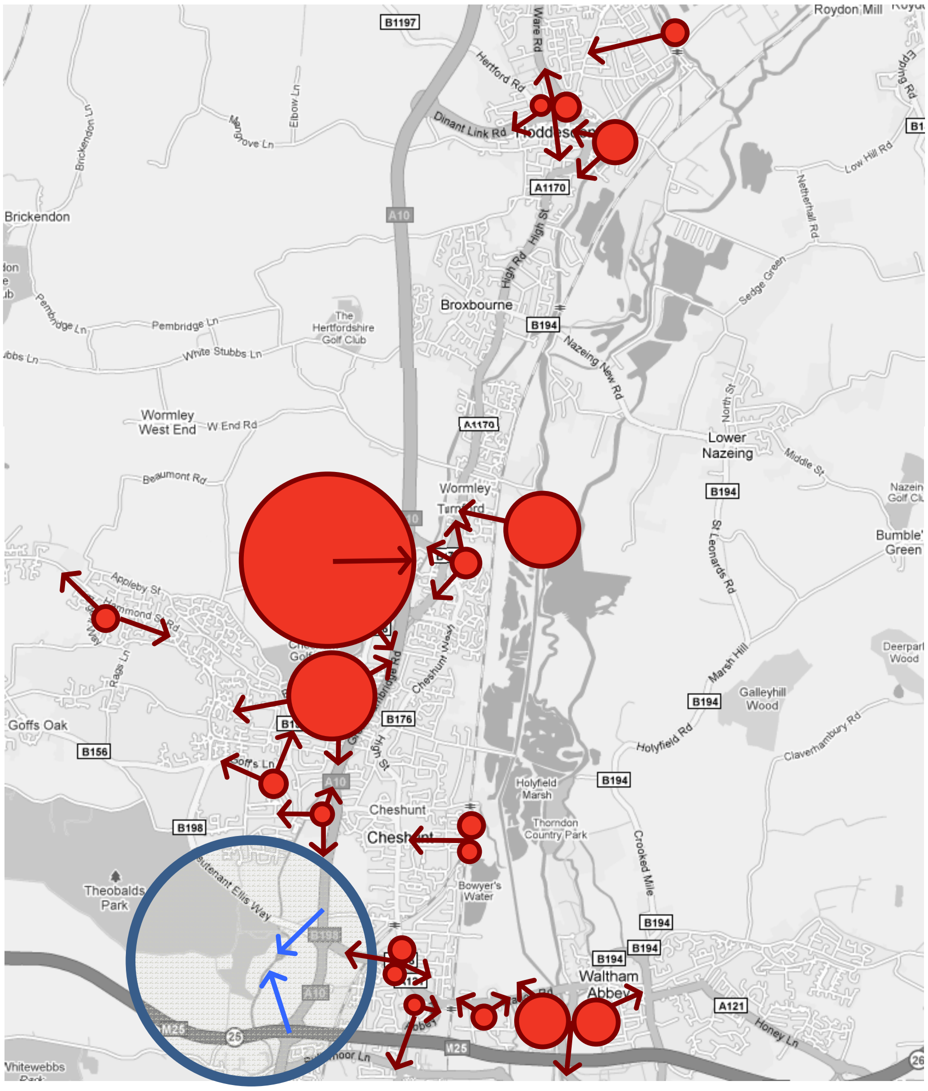
2.8.2 Access points for each of the Core Strategy developments were specified by BBC, including indicative junction arrangements. Further detail is provided in Appendix 7.

Simple assignment process

2.8.3 The first, simple assignment process calculated the general direction of flow likely to be generated by each scenario in the area immediately surrounding development access points. This was based on trip distribution information used in TAM combined with a compass point direction (what proportion of these trips then head North, South, East, or West?). Indicative assignment flows therefore produced for each of the Core Strategy scenarios to give a general 'feel' for level of additional vehicle movement on the highway network – including cross-comparability between scenarios.

2.8.4 The scenario that considers committed schemes and SHLAA sites (referred to in this report as S2) has a more complex assignment due to the multiple, small development sites across the Borough. Figure 2.4 shows the relativity between the various development sites and also the main assignment paths on the immediate highway network.

Figure 2.4 Scenario 2 assignment plot



Full assignment process

2.8.5 The revised, full assignment process saw a step-change in detail compared to the initial simplified process. Detailed routes were created between each development site being tested and each TAM origin/destination zone.

2.8.6 There were multiple routes permitted between development sites and origin/destination zones; this removed a weakness in simple spreadsheet models where trips are assigned on an 'all or nothing' basis. Typically the multiple routes that were set up included clear choices such as accessing LB Enfield via the A10 or A1010, accessing Harlow via the A414 or Essex Rd or Nazeing Rd, etc. The relative attractiveness of each route choice was individually controlled on a site-by-site basis with a general preference given to the A10 corridor for mid and long-distance trips rather than the parallel A1170.

2.8.7 Local rat-runs and other congestion avoiding routes were included in the model although the Borough's highway network does not easily allow for localised re-routing, particularly in a north-south direction.

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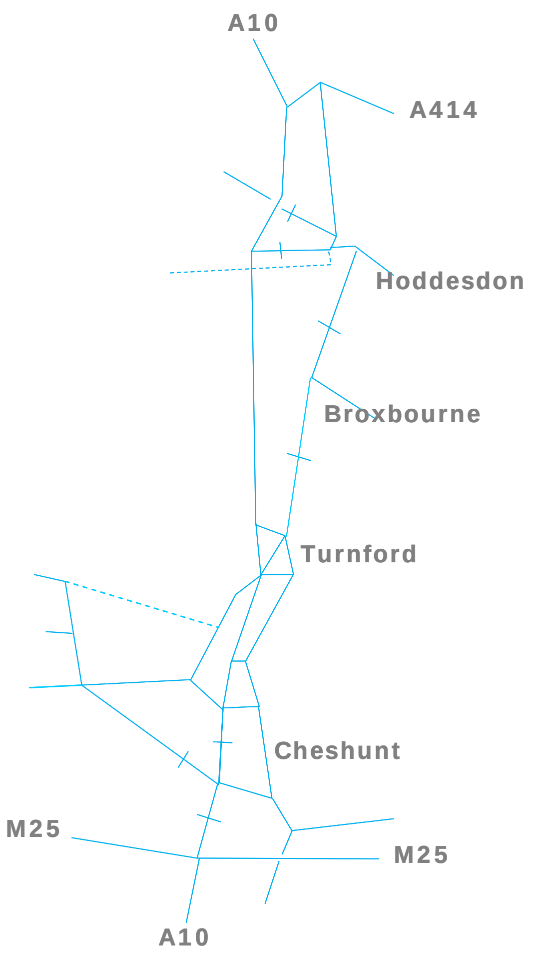
2.8.8 Figure 2.5 below shows how the Borough's highway network is represented within TAM.

Figure 2.5 TAM highway network



2.8.9 Dotted lines represent links used in the TAM network that are not included in the EERM model (see subsequent Figure 2.6). The 'cross hair' link arrangements shown in a number of locations are individual development access links that enable more detailed link flows and junction turning movements to be calculated.

2.9 Strategic highway model

2.9.1 In parallel with the development of the bespoke spreadsheet model (TAM), additional data has been sourced from the Hertfordshire Infrastructure Investment Study (HIIS). Data has made available to MVA that includes future year flow information for all major links/junctions across the Borough. This future year data is available for 2011, 2021, 2031 – ie up to, and beyond, the Core Strategy time horizon.

2.9.2 Extracting relevant data from the HIIS study enables a future 'baseline' assessment to be made of the highway network without any additional Core Strategy development. By combining the high-level, strategic spreadsheet approach with detailed HIIS transport model outputs it has been possible to provide a robust, sophisticated view of how the Borough's highway network could perform with/without Core Strategy development. Furthermore this study is entirely consistent with other work that has been conducted by HCC (HIIS and any other spin-off work) and can easily be updated using different model runs if required. Section 2.9.6 considers some 'double-counting' implications of using this HIIS data in conjunction with Core Strategy development.

2.9.3 It is important to note that the use of HIIS data does have limitations. Model forecasts are only estimates and so it is not possible to provide definitive conclusions about highway link and junction performance in future years. For this reason we have adopted a relatively low threshold (see section 4.1.1) when determining locations of poor network performance.

2.9.4 The alternative to using HIIS data would be to take current traffic count data and factor it to a common base year (eg 2010) and then apply growth factors to create a future forecast year. The distribution of count data across the Borough is reasonable although far from complete. This lack of flow information for all major links/junctions, combined with the need to estimate future year growth (both background and due to development in neighbouring authorities), made using the HIIS data the most appropriate solution.

East of England Model

2.9.5 HIIS was undertaken using inputs from the East of England Regional Model (EERM). The highway model component of EERM has a strategic focus with a representation of the network and flows across the East of England. Future transport improvements are represented in the model and ‘background’ traffic growth is also included that takes into account factors such as increased car ownership and use over time.

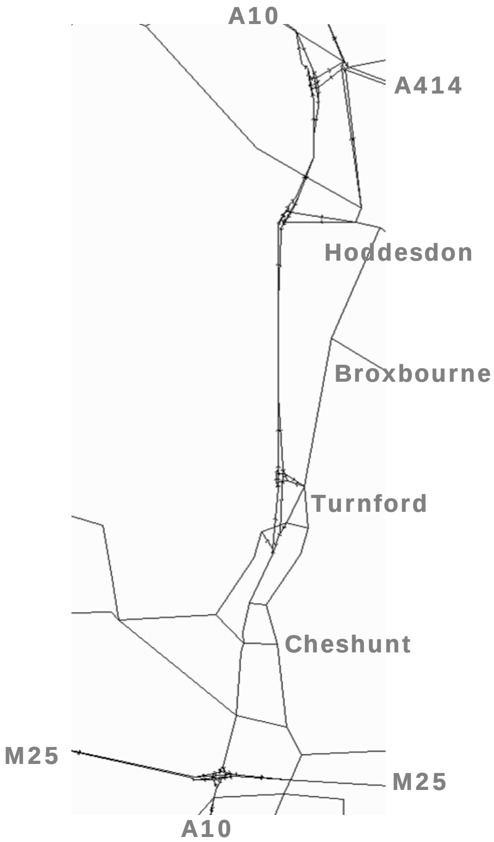
2.9.6 Future year land use developments, consistent with those in the East of England Plan, are also represented in EERM. Alternative scenarios were made available for a 2021 forecast year which considered 'with East of England Plan development' and 'without East of England Plan development'. The difference in network flow in the Borough between these two different 2021 scenarios is generally relatively minor which would suggest that the impact of East of England Plan development may not, in itself, have a significant impact on highway performance.

2.9.7 Combining TAM model outputs that specifically consider BBC development and 2031 forecast year EERM data (which includes East of England Plan development, also including BBC) is, whilst still being robust and conservative, a reasonable approach given the limited assessed impact of any implied double counting.

2.9.8 As mentioned above, data is available for a variety of model years. Only 2031 data was used as this represents maximum highway flows due to background growth and RSS-specific growth and maximum Core Strategy development.

2.9.9 Figure 2.6 below shows how the Borough’s highway network is represented within EERM.

Figure 2.6 EERM highway network



Transposing

2.9.10 HIIS-sourced EERM data was made available for the AM peak period only. In order to create PM peak period data a transposing exercise was undertaken. The first stage was to reverse AM flows so that:

- PM northbound = AM southbound (or vice versa, for all other directions); and
- PM southbound = AM northbound (or vice versa, for all other directions).

2.9.11 The second stage of the process was to investigate current day flow data at a number of locations across the Borough. Synthetic PM flows (transposed AM) were compared against actual PM flows to see whether it was necessary to apply any factors to account for tidality of flow or other factors.

2.9.12 It was determined that is was necessary to apply factors to the synthetic future year PM flows in order to better match the patterns observed at present. A set of factors were developed based on link/junction location within the Borough:

- A10 corridor – synthetic PM flows uplifted by 5%;
- A1170 corridor – synthetic PM flows uplifted by 7.5%;
- B198 / B176 / A121 corridors and southern parts of the Borough – synthetic PM flows uplifted by 5%; and
- other rural roads including the west of the Borough – synthetic PM flows uplifted by 12.5%.

2.9.13 The factors selected are at the high-end of what could have been chosen from the analysis of existing data. This conservative approach was taken in order to not underestimate PM flows in the future year 'baseline' assessment which may exhibit potentially different characteristics to those currently observed.

2.10 Composite model

2.10.1 The final element of the study methodology was the development of a composite model that combined the high-level strategic outputs from the TAM spreadsheet model with the detailed link and junction outputs from the HIIS study.

2.10.2 The key information used in the composite model was as follows:

- theoretical capacity (what is the maximum number of vehicles that can use a link / junction per hour) – obtained from HIIS;
- actual capacity (as theoretical capacity but reduced due to the impact of congestion/queues 'blocking back' from other locations) – obtained from HIIS; and
- model flows – obtained from TAM and HIIS.

2.10.3 The composite model extracted individual link and junction flows from EERM. This includes all movements for grade separated junctions – merges, diverges and circulating links. These flows were then combined with the respective TAM outputs to create bespoke future year highway flows for each development package being tested. TAM outputs are available on a scenario-by-scenario basis which enables combinations to be formed that represent specific packages.

2.10.4 Because the network structure of TAM was designed to be essentially identical to the HIIS/EERM network, combining flow output data from the two core models is a simple, easily-repeatable task. This includes calculating flows within complex grade-separated junctions.

Composite flow for link x = EERM modelled flow for link x + TAM flow for link x

where: TAM flow for link x varies by Package (and respective component scenarios)

2.11 Interventions testing

2.11.1 These final composite network flows (TAM+EERM) were then compared against known network capacities to give an indication of network performance (see Chapter 4). Updating capacity information for particular links and/or junctions was then undertaken to test the impact of highway schemes and whether a particular intervention could succeed in reducing pressure at particular hot-spots or pinch points in the network (see Chapter 5).

2.11.2 Utilising the detailed model data from EERM allowed existing highway capacity to be accurately assessed, particularly for grade-separate junctions which are fully expanded to include all movements. This availability of detailed model information enabled an assessment of specific junction improvements to be made to a suitably-refined level without having to be build separate, individual TRANSYT and ARCADY models.

3 Scenarios / Packages

3.1 Scenarios

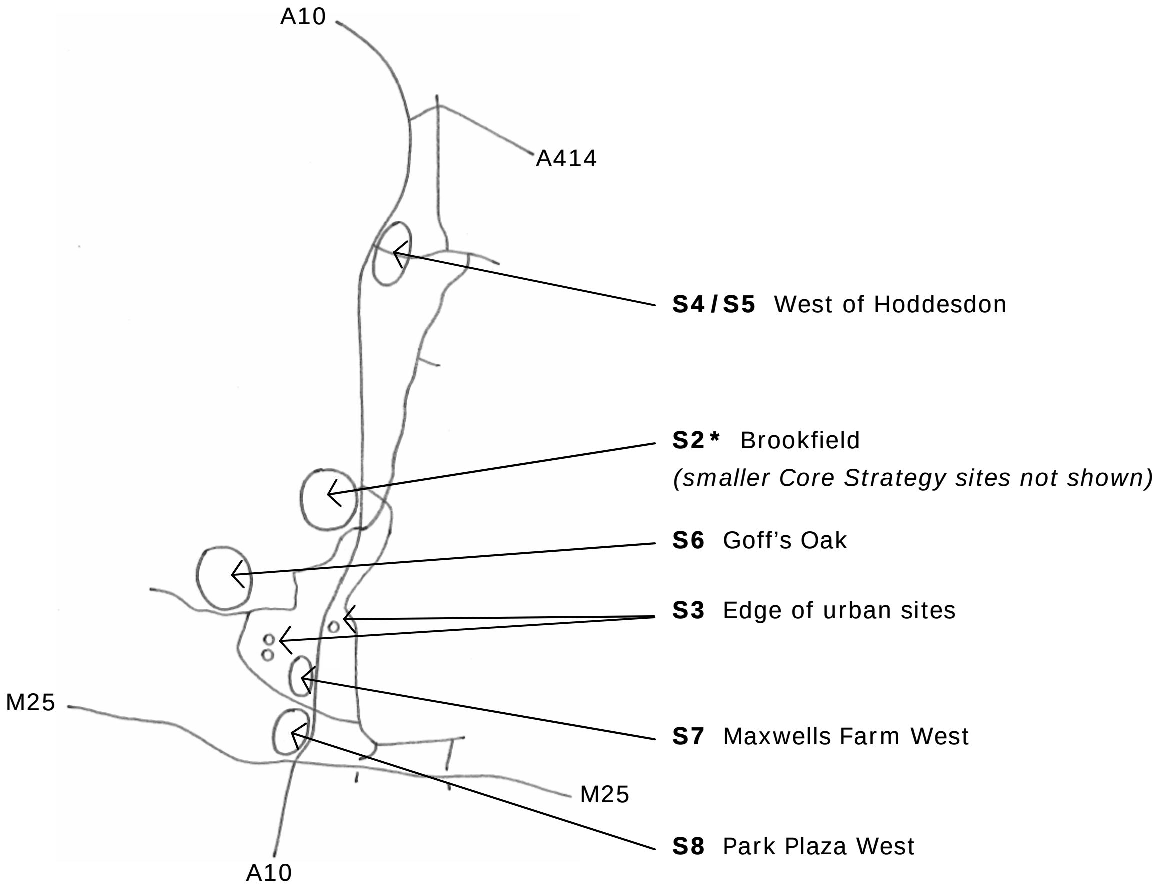
3.1.1 A range of development scenarios have been specified by BBC for testing by MVA Consultancy – see Table 3.1 below. The difference between Scenarios 4 and 5 relate to how the development is accessed – using the existing highway network (S4) or a new access onto the A1170 Dinant Link Road (S5).

Table 3.1 Development scenarios tested

#	Development description	Development quantum
S1	Baseline	No BBC growth, external growth included
S2	Core Strategy – including:	
	Commitments + SHLAA →	2,700 residential units
	Park Plaza North →	33,000m^2 mixed use employment
	Greater Brookfield →	50,000m^2 retail +
		10,000m^2 leisure +
		110 room hotel +
		500 residential units
S3	Edge of Urban Sites	300 residential units:
	Albury Farm (accessed from Albury Ride)	100 residential units
	Bury Green Road	100 residential units
	St. Mary's School Playing Field W	100 residential units
S4	West of Hoddesdon (urban access)	1,000 residential units
S5	West of Hoddesdon (A10 access)	1,000 residential units
S6	Goff's Oak	1,000 residential units
S7	Maxwells Farm West (left-in/left-out access)	100,000m^2 general industry
S8	Park Plaza West	100,000m^2 office

3.1.2 The data for Scenario 2 (Core Strategy) is based on a list of sites prepared by BBC at the beginning of 2010 and the March 2010 Strategic Housing Land Availability Assessment report. It should be noted that this SHLAA report has now been amended and will continue to be amended with sites being removed or completed and new sites added.

Figure 3.1 Core Strategy development scenarios location map



3.2 Packages

3.2.1 The individual scenarios were then aggregated into 'Packages' to test various development strategies using the Core Strategy (S2) as a common base – shown in Table 3.2 below.

Table 3.2 Development 'Packages' tested

#	Package Description	Development Scenarios
P1	Baseline	S1
P2	Core Strategy only	S1+**S2**
P3	West of Hoddesdon	S1+**S2**+S3+S4
P4	Goff's Oak	S1+**S2**+S3+S6
P5	Maximum	S1+**S2**+S3+S4+S6+S7+S8

3.2.2 The packages have been tested individually with consequent highway impacts and interventions identified for each package.

3.3 Trip generation totals

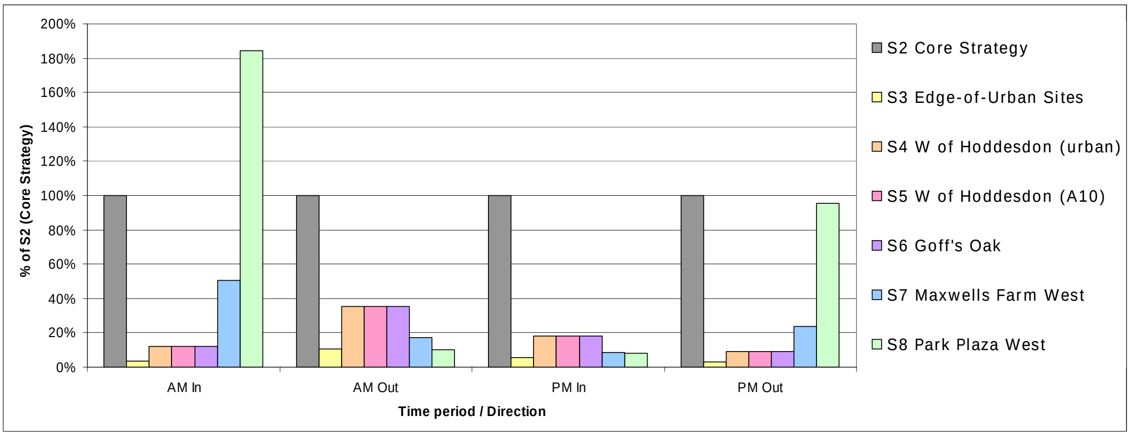
3.3.1 A summary of **vehicle** trip generation for the various scenarios and packages is shown in Figure 3.2 below.

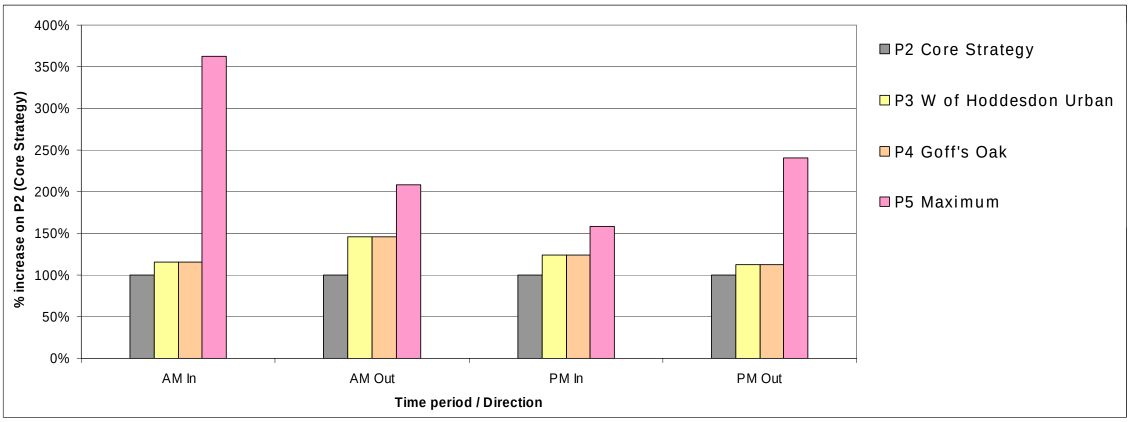
Figure 3.2 Trip generation totals (scenario and packages)

Code	Description		Total vehicle flow			
			AM In	AM Out	PM In	PM Out
S2	Core Strategy		767	822	1117	1337
S3	Edge-of-Urban Sites		28	88	62	38
S4	W of Hoddesdon (urban)		91	289	203	124
S5	W of Hoddesdon (A10)		91	289	203	124
S6	Goff's Oak		91	289	202	124
S7	Maxwells Farm West		387	142	96	320
S8	Park Plaza West		1413	84	89	1279
P2	Core Strategy	S1+S2	767	822	1117	1337
P3	W of Hoddesdon Urban	S1+S2+S3+S4	887	1200	1382	1499
P4	Goff's Oak	S1+S2+S3+S6	886	1199	1382	1499
P5	Maximum	S1+S2+S3+S4+S6+S7+S8	2778	1715	1770	3223

3.3.2 Figure 3.3 below shows the relativities between the scenarios and packages where the Core Strategy (S2 or P2; grey bar) equals 100%.

Figure 3.3 Trip generation summary by scenario and package





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3.3.3 A comparison between individual scenarios shows the relative dominance of the Core Strategy (S2) compared to individual developments (S3 to S7). The exception is Park Plaza West (S8) which generates a substantial amount of movement as a direct consequence of the large quantum of office development.

3.3.4 Whilst the Core Strategy is substantially larger in scale than S3 to S7, it should be remembered that the development is spread across a large number of sites across the entire Borough. This means that, in general terms, the level of increase in vehicle flow at any particular location may not be significantly different in scale to one of the other scenarios (see Figure 2.4, section 2.8.4) for an indicative plot of the relativities of the component sites in the Core Strategy (S2).

Packages

3.3.5 Aggregating the scenarios up into the final packages reveals that the Core Strategy (P2) does not differ significantly from P3 or P4. The maximum development package (P5) however shows a marked increase in generated trips. Again this is primarily due to the inclusion of Park Plaza West (S8) with its significant office quantum and also Maxwells Farm West (S7) with a sizeable quantum of general industrial uses.

3.3.6 This would suggest that Packages 2, 3, and 4 may have broadly similar impacts on the highway network (immediate development access locations notwithstanding) to each other but that Package 5 may place different, increased pressures on the network. This is considered in more detail in the next chapter.

4 Highway 'Stress'

4.1 Definition

4.1.1 The impact of Core Strategy development on the highway network has been assessed in terms of highway 'stress'. The measure of stress used in the study is a ratio of traffic volume (V; number of vehicles per hour, by direction, for a particular road or junction) against its capacity (C; maximum number of vehicles per hour, by direction, that can be accommodated). Where the ratio of V/C exceeds 80% it would suggest that a road or junction is approaching its maximum capacity and could be expected to begin generating congestion and delays.

4.2 Existing future year stress (Baseline – no Core Strategy Development)

4.2.1 Data obtained from Hertfordshire Infrastructure Investment Study (HIIS) enabled an assessment to be made of future highway stress both with and without the Core Strategy Packages.

4.2.2 The forecast year for assessment of all the Core Strategy packages was chosen as 2031 as it represented the maximum level of flow as predicted by the HIIS data. In comparison the 2021 forecast year saw lower flows with 2011 lower still.

4.2.3 The following roads / junctions are predicted to be under stress (greater than 80% V/C) by 2031 for the AM and/or PM peak periods **without** any Core Strategy development:

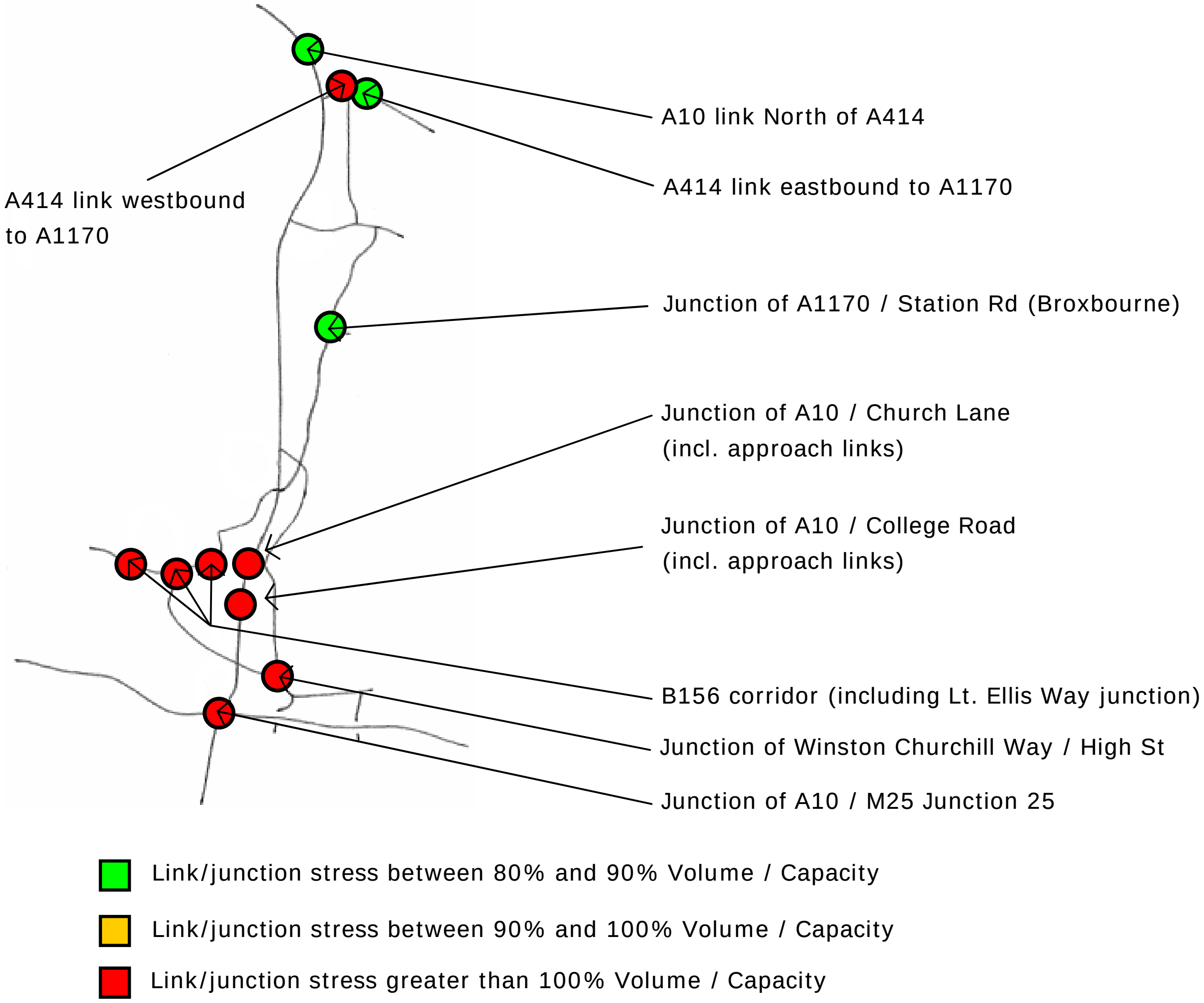
Junctions

- junction of A10 and Church Lane (AM+PM);
- junction of A10 and College Road (B198) (AM+PM);
- junction of A10 and M25 (junction 25) (AM+PM); and
- junction of Lt. Ellis Way (B198) and Goff's Lane (B156) (AM+PM);
- junction of Winston Churchill Way (A121) and High St (B176) (AM+PM);
- junction of A1170 and Station Road (Broxbourne) (PM only).

Links (excluding those connected to junctions listed above)

- A10, north of A414 junction (AM+PM);
- A414 eastbound, approaching A1170 junction (PM only);
- A414 westbound, approaching A1170 junction (AM only); and
- the B156 corridor along Goff's Lane and Churchgate Road (AM+PM).

Figure 4.1 Location of Baseline highway stress (AM and PM peak periods)



4.2.4 For the above links and junctions, the highway network will be under stress without any additional development arising from Broxbourne's Core Strategy (although development in Broxbourne has been assumed to an extent in the EERM model data used). The addition of development demand due to the Core Strategy will lead to increased pressure in these locations which may require additional intervention.

4.3 Analysis – Package 1 (Baseline)

4.3.1 Independent of any Core Strategy development, there are a number of locations where the highway network is predicted to experience stress in future years. The most critical of these are the two at-grade signalised junctions on the A10 at Church Lane and College Road. The relatively poor performance of these junctions also is impacting on the link performance of the A10, primarily due to additional queuing developing.

4.3.2 The other location of concern is the M25 / A10 junction. Future model flows indicate that this junction will be operating close to, or at, capacity and so would suggest that there will be minimal spare capacity to accommodate additional vehicle flows arising from Core Strategy development.

4.4 Additional stress (Core Strategy development Packages 2 to 5)

4.4.1 Combining the future year baseline data from HIIS and outputs from MVA Consultancy's TAM spreadsheet model enables an assessment to be made of future highway stress for each of the Core Strategy Packages.

4.4.2 A number of roads / junctions are predicted to be under stress (greater than 80% V/C) by 2031 for the AM and/or PM peak periods **as a result of Core Strategy development.** This is **in addition to Package 1** (Baseline).

4.4.3 Those links and junctions identified as being under stress without any Core Strategy development (paragraph 4.2.3) will be placed under further stress in all of the Core Strategy Packages. In many cases this additional stress leads to locations, particularly the at-grade junctions on the A10, experiencing demand flows considerably in excess of available capacity.

4.4.4 The impact of each package is considered in turn – summary diagrams highlighting levels of stress (colour-coded orange, red and maroon) and whether present in the baseline package (baseline = circles; new stress due to other package = boxes).

4.4.5 The location of additional stress for all packages shows a similar pattern for the AM and PM peak periods when displayed in the colour-coded symbols. Junction stress is unchanged whilst link stress is directional (ie southbound AM stress switches to northbound PM stress) but the overall magnitude of the stress is unchanged.

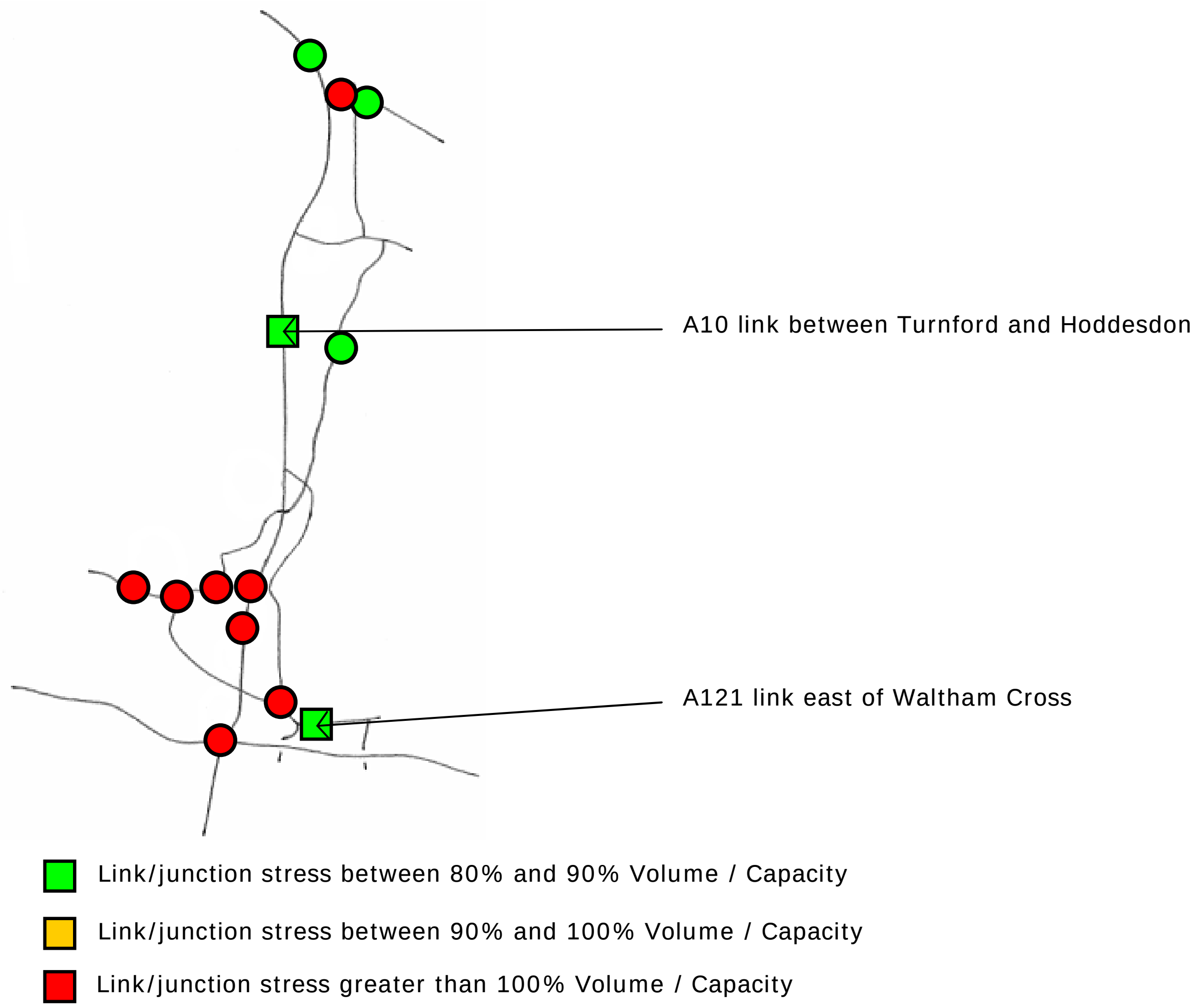
4.5 Analysis - Package 2 (Core Strategy only)

4.5.1 Combining the Baseline Package (P1) and Core Strategy development leads to a relatively modest range of impacts on the highway network. Additional stress is placed on the A10 north of A1170 Turnford junction (northbound – AM; southbound – PM) but the link is predicted to still be operating within capacity.

4.5.2 The other location of new, additional network stress is on the A121 east of Waltham Cross in the PM peak period – however the link is predicted to still be operating within capacity.

4.5.3 It is also worth noting that Core Strategy development places additional stress on the all links and junctions that are stressed in the Baseline package (P1) – particularly the case for the College Road and Church Lane at-grade A10 junctions which are significantly over capacity. Unchecked, this could lead to extensive congestion and queuing on all approaches to both junctions.

Figure 4.2 Additional highway stress locations – Package 2
[where existing P1 stress = circles; extra P2 stress = boxes + labels]



4.6 Analysis – Package 3 (Core Strategy + West of Hoddesdon with urban access)

4.6.1 The inclusion of the development to the West of Hoddesdon (urban access) in addition to Core Strategy development (Package 2) leads to additional stress being placed on the highway network at several other locations.

4.6.2 The first is Hertford Road eastbound towards Hoddesdon in the AM peak period – this is due to most traffic generated by the development heading east before continuing either on the local network or using the A1170 Dinant Link Road to access the A10 and strategic connections.

4.6.3 As with the Core Strategy only package (P2), additional stress is placed on the A10 north of A1170 Turnford junction (northbound – AM; southbound – PM) but the link is predicted to still be operating within capacity. Similarly another location of additional network stress is on the A121 east of Waltham Cross in the PM peak period – however the link is predicted to still be operating within capacity.

4.6.4 The final location for additional, new network stress is along the A10 northbound between M25 J25 and the Lt. Ellis Way junction and then northbound along Lt. Ellis Way towards the Goff's Lane roundabout.

4.6.5 This only occurs in the PM peak period where the two links are just above the 80% V/C threshold – excluding the additional flow due to the West of Hoddesdon development returns the V/C levels to just under the 80% threshold. The operational performance of these links should still be satisfactory under these conditions.

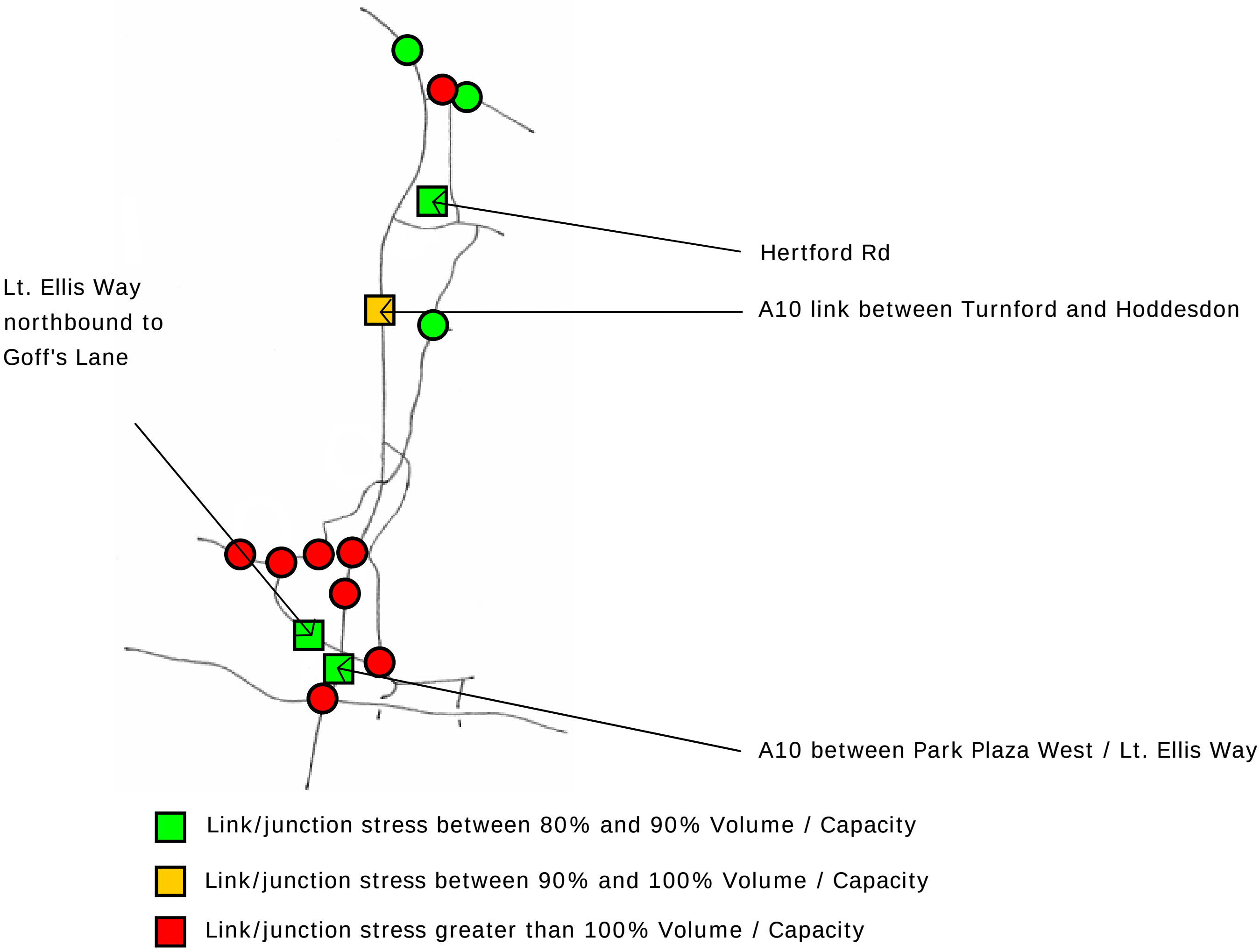
4.6.6 The A10/College Rd junction is again placed under additional stress with this package – although this is as a consequence of Core Strategy development rather than any specific West of Hoddesdon development *per se*. The additional development at West of Hoddesdon merely increases junction pressure beyond its already poor condition.

Direct access onto A10

4.6.7 Access to/from the West of Hoddesdon development has been assumed to be provided by Hertford Road and Lord Street with strategic access then provided by the A1170 Dinant Link Road and the A10. This assumption has been made in order to test the 'worst case' situation where all development flows use the local highway network with no additional capacity supplied.

4.6.8 A sensitivity test could be undertaken that considers direct access onto the A1170 and what impact this has on flows in the local area. However, results from this study would indicate that a dedicated access onto the A1170 is not required on network stress grounds as Hertford Road, Lord Street, and the A1170 roundabout they ultimately connect to are all estimated to be operating within capacity.

Figure 4.3 Additional highway stress locations – Package 3
[where existing P1+P2 stress = circles; extra P3 stress = boxes + labels]

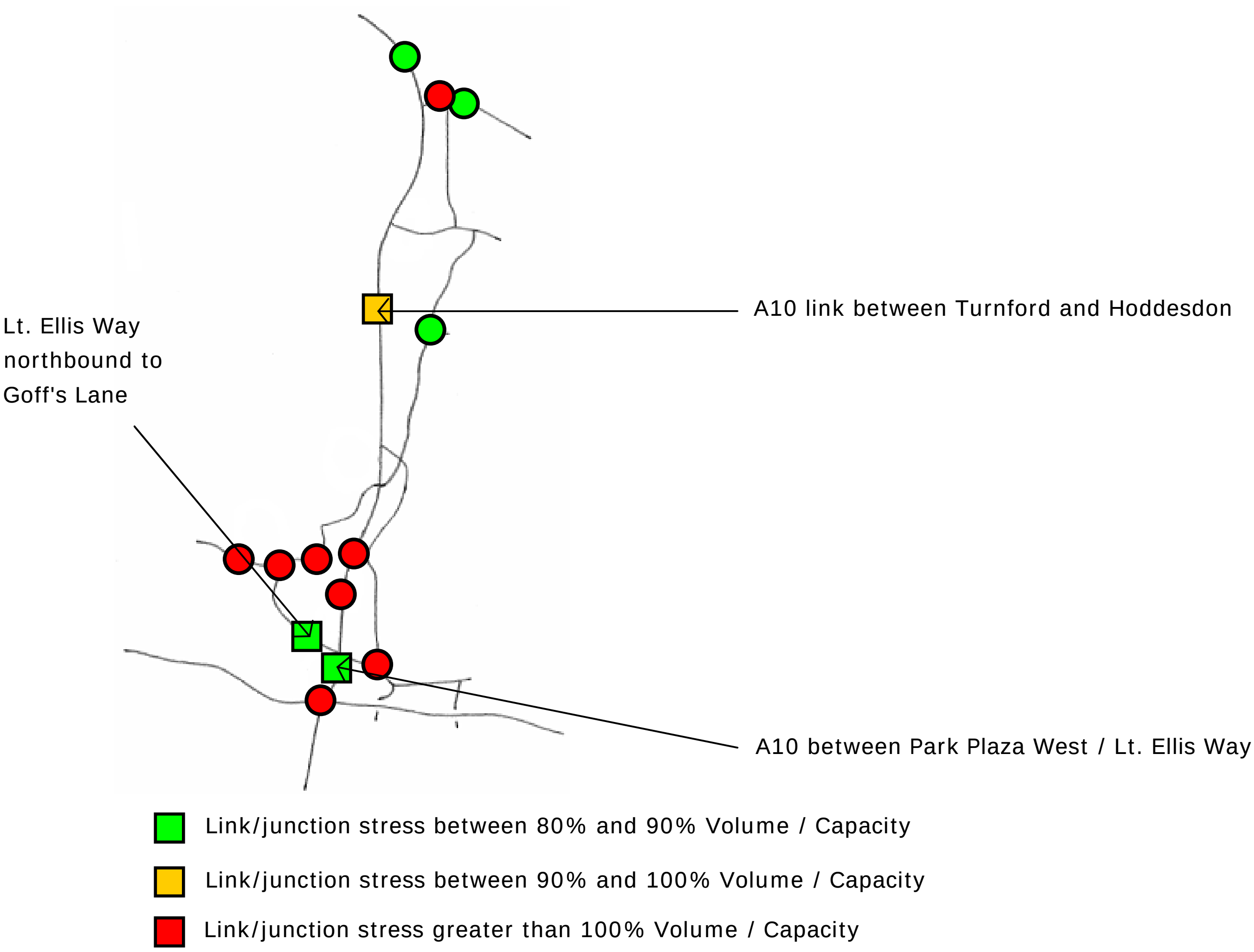


4.7 Analysis – Package 4 (Core Strategy + Goff's Oak)

4.7.1 The inclusion of the development at Goff's Oak in Package 4 is predicted to lead to additional stress being placed on the highway network in locations very similar to the previous package. Locations are: A10/Church Lane, A10/College Rd, A121 east of Waltham Cross, A10 northbound approaching Lt. Ellis Way, and Lt. Ellis Way to/from Goff's Lane.

4.7.2 Additional stress is placed along the already congested B156 corridor due to close proximity of the development at Goff's Oak.

Figure 4.4 Additional highway stress locations – Package 4
[where existing P1+P2 stress = circles; extra P4 stress = boxes + labels]



4.8 Analysis – Package 5 (Core Strategy + Maximum additional development)

4.8.1 Maximum development as modelled in Package 5 places the most pressure on the highway network. All the issues outlined in previous sections also apply to this Package with the addition of link stress on the A10 between M25 J25 and the Park Plaza West development access. This is a direct consequence of the Park Plaza West office development which places substantial additional flow in the immediate surrounding area. This includes M25 J25, particularly in the PM peak period.

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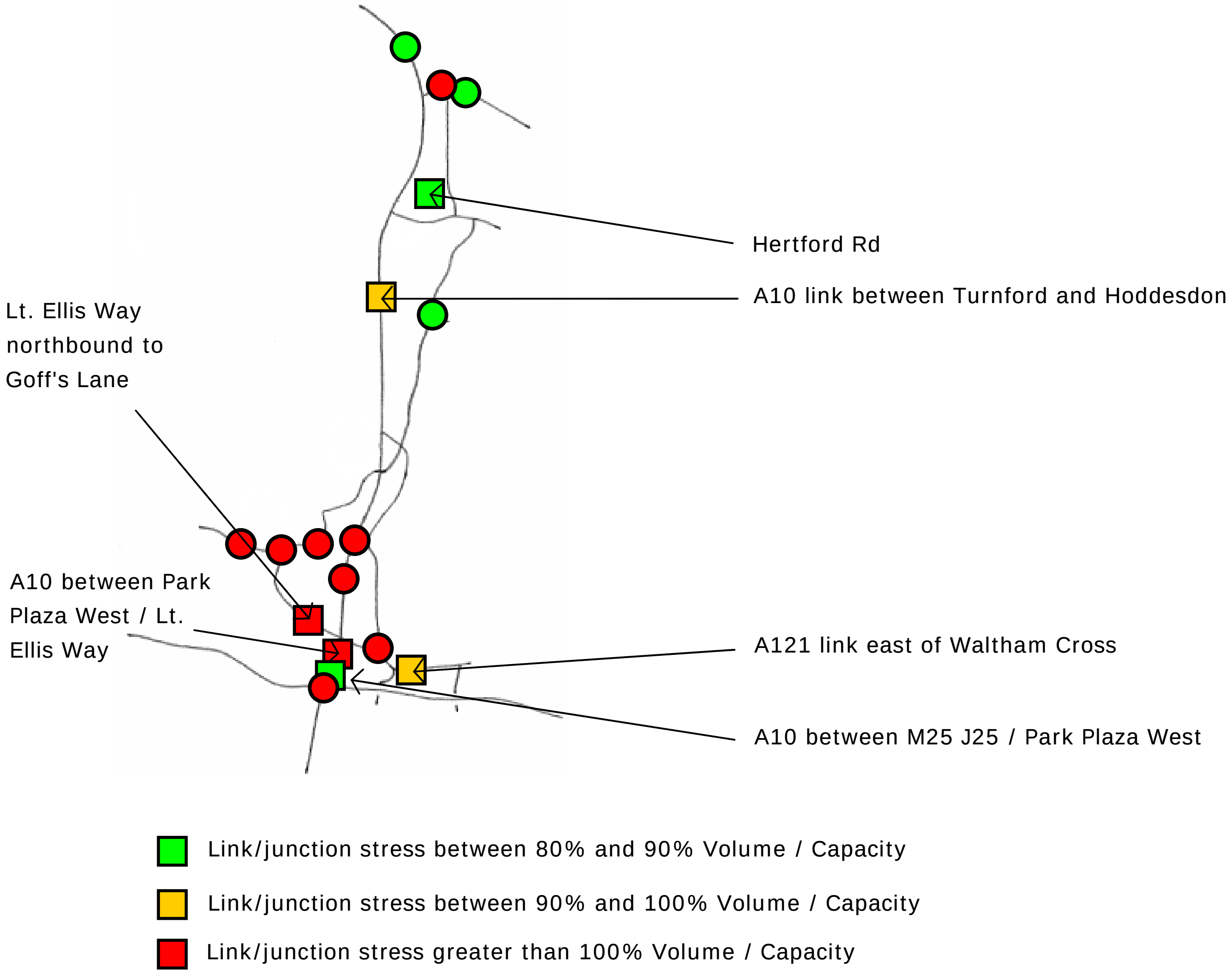
Figure 4.5 Additional highway stress locations – Package 5
[where existing P1+P2 stress = circles; extra P5 stress = boxes + labels]



4.9 Summary of network stress

4.9.1 Table 4.1 overleaf summarises locations of network stress for each of the packages (AM peak period only, PM peak period only, or both).

Table 4.1 Locations of network stress by Package

Link / Junction	Time Period	P1	P2	P3	P4	P5
A10 link north of A414	AM+PM	[green]	[green]	[green]	[green]	[green]
A414 link westbound to A1170 junction	PM	[red]	[red]	[red]	[red]	[red]
A414 link eastbound to A1170 junction	AM	[green]	[green]	[green]	[green]	[green]
Junction of A1170 / Station Rd (Broxbourne)	PM	[green]	[green]	[green]	[green]	[green]
Junction of A10 / Church Lane	AM+PM	[red]	[red]	[red]	[red]	[red]
Junction of A10 / College Rd	AM+PM	[red]	[red]	[red]	[red]	[red]
B156 Corridor (including Lt. Ellis Way junction)	AM+PM	[red]	[red]	[red]	[red]	[red]
Junction of Winston Churchill Way / High St	PM	[red]	[red]	[red]	[red]	[red]
Junction of A10 / M25 J25	AM+PM	[red]	[red]	[red]	[red]	[red]
A10 link between Turnford and Hoddesdon	AM+PM		[green]	[amber]	[amber]	[amber]
A121 link east of Waltham Cross	PM		[green]	[green]	[green]	[amber]
Hertford Rd	AM			[green]		[green]
A10 link north of Park Plaza West + Lt. Ellis Way northbound to Goff's Lane	PM			[green]	[green]	[red]
A10 link between M25 J25 and Park Plaza West	PM					[green]

where:

- [green] Link/junction stress between 80% and 90% Volume / Capacity
- [amber] Link/junction stress between 90% and 100% Volume / Capacity
- [red] Link/junction stress greater than 100% Volume / Capacity

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5 Interventions

5.1 Overview

5.1.1 Where required, potential interventions/solutions have been investigated that mitigate the impact of additional stress on the highway network as a consequence of Core Strategy development. This analysis has been extended to a consideration of what is required to improve the future baseline situation without any Core Strategy development.

5.2 Wider considerations

5.2.1 It is important to note that interventions to improve highway network performance can be either supply-based or demand-based. Supply-based interventions are typically related to increases in capacity (road widening, junction improvements) whilst demand-based interventions can be much more wide ranging – often combined into a catch-all term 'Smarter Choices'.

5.2.2 Smarter Choices interventions can include: area-based travel planning (homes, workplaces, schools, destinations – eg Brookfield); car clubs and car sharing; flexible working hours and home working; potential for car free development; and workplace parking restraint / incentives for alternative travel. These interventions lead to, in general terms, a shift in travel mode from car to non-car modes and also a reduction in overall trip making (ie unnecessary trips no longer made). Many of these interventions are appropriate given the scale of residential / employment development being proposed in the Core Strategy.

5.2.3 This modelling study has not assumed any significant changes to existing travel behaviour and/or travel patterns. As such it represents a worst case where development impact has not been mitigated at source by any significant demand-based interventions. The range of interventions that could be applied to reduce identified highway stress points should therefore be a mix of demand and supply measures.

5.2.4 Some indicative supply-based interventions are provided below. It should be noted that these interventions are conceptual in nature and are based on the strategic modelling work undertaken. Detailed modelling work is required to confirm these, and any other highway improvements. As highlighted above, by implementing demand-based interventions it is possible to reduce highway flows which may remove, or delay, the need for highway improvements.

5.2.5 A significant intervention that could be delivered at an early stage would be to undertake a comprehensive analysis of the A10 corridor (a Route Management Strategy - RMS). Developing such a strategy could play a key role in understanding the specific problems at a number of A10 junctions and what opportunities there are to solve them. Just as importantly the strategy could investigate options for promoting reduced car use and for travelling by alternative modes as a key component in mitigating against increased future traffic flows.

Urban section of A10

5.2.6 Another important consideration that a RMS could investigate is the role of the A10 in the most 'urban' section of the corridor (broadly between the Church Lane and College Road junctions). Currently this section of the A10 is primarily highway-focussed with little regard given to other road users, in particular pedestrians and cyclists.

5.2.7 The two junctions are currently at-grade and offer the most direct east-west connections over the A10 which otherwise acts as a barrier that severs movement. However the quality of public realm in these areas is poor and is not inviting to use and as such could discourage trips to be made by non-car modes.

5.2.8 By improving how these two junctions work for all modes (ie vehicles but also pedestrians and cyclists) it is possible to reduce the severance impact of the A10, enable to the eastern and western sides of the corridor to better connected, and encourage more local short-distance trips to be made on foot or by cycle. This latter benefit in itself could help to reduce vehicular pressure on these (and other) junctions thereby possibly reduce the scale of additional mitigation.

5.2.9 In the sections below there is reference made to 'major remodelling' and other measures. Within this catch-all description it is expected that the needs of all road users are incorporated into a final design that aims to bring benefits across a range of modes.

5.3 Indicative interventions - junctions

Junction of A10 / Church Lane [ALL PACKAGES]

5.3.1 Major remodelling is required at this junction for all packages, including Baseline. Providing additional stop-line capacity is crucial in reducing pressure on the junction. This could take the form of an additional lane on the westbound Church Lane approach (increasing to two lanes) and widening the A10 approaches (both northbound and southbound) to three lanes.

5.3.2 The availability of additional land to undertake this widening may be limited by existing properties and other buildings and so may be relatively difficult to deliver. The alternative would be to grade separate the junction by providing an underpass for the main A10 north-south movement. This grade-separation option offers a step-change in junction performance but also in terms of engineering complexity, scheme deliverability, and obviously cost.

5.3.3 Indicative scheme costs are c.£1 million to £2 million for junction widening (although this is highly sensitive to any statutory undertakers diversions) and in the order of >£10 million for grade separation.

Junction of A10 / College Road (B198) [ALL PACKAGES]

5.3.4 Major remodelling is also required at this junction given the level of stress that it is predicted to be under in all packages. The scale of the existing junction is significant (four-lane stop-lines on the A10 northbound and southbound) but there is potential to improve the current layout through realignment (particularly the minor arms). There is also the possibility of utilising surrounding low-grade land for localised widening where required. Any changes would clearly need to be carefully planned to not further reduce the quality of environment, particularly for pedestrians and cyclists.

5.3.5 Grade separation is an alternative option at this location and could be achieved through the construction of an underpass for the main A10 north-south movement. As with the Church Lane junction, such a scheme can offers a step-change in junction performance but also increases engineering complexity, scheme deliverability, and ultimately cost.

5.3.6 It should be noted that the improvements to this junction should ideally be made in parallel to improvements at the A10 / Church Lane junction (see above); relieving pressure at this junction but not the other one may merely lead to stress being shifted further to the north. This could include linking both signalised junctions with a SCOOT and/or MOVA traffic control system.

5.3.7 There is also some scope for considering linking both junctions (Church Lane and College Road) by constructing a much longer grade separation scheme that effectively bypasses both – this however would entail substantial construction costs and as such may not be financially viable.

5.3.8 Indicative scheme costs are c.£1 million to £2 million for junction widening (although this is highly sensitive to any statutory undertakers diversions) and in the order of >£10 million for grade separation.

Junction of A10 / M25 J25 [ALL PACKAGES]

5.3.9 Detailed consideration of this junction would be extremely complex and is beyond the scope of this study. However, initial consideration of potential interventions includes: widening approach links to the roundabout from two to three lanes; widening stop-lines from three to four lanes; and increase the number of circulating lanes from two to three lanes. This last intervention is probably the most complex as it could require new overbridges across the main M25 carriageways. An alternative option where grade separation for the A10 north-south movement is introduced would be prohibitively expensive and not financially viable we believe.

5.3.10 The cost of a comprehensive package of interventions at this location will be substantial and could be expected to be in excess of £10 million.

High Rd (A1170) / Station Rd Broxbourne (B194) [ALL PACKAGES]

5.3.11 Whilst this junction is predicted to be operating at capacity, this is believed to be as a consequence of modelling assumptions in EERM (assumed to be a simple priority 'T' junction). The existing junction is already fully signalised and has dedicated lanes for each turning movement; as such it is not proposed to include any further interventions at this location.

Junction of Lt. Ellis Way (B198) / Goff's Lane (B156) [ALL PACKAGES]

5.3.12 The existing junction is a large-diameter roundabout with mostly two-lane approaches. Additional capacity could be provided through a partial or full signalisation scheme. An indicative cost for the signalisation work would be c.£250,000.

Winston Churchill Way (A121) / High St (B176) [ALL PACKAGES]

5.3.13 The existing junction is already signalised and so there is limited scope to improve junction capacity. Analysis of where the most significant problem is at the junction would suggest that improvements to the northern arm would be most beneficial to reducing stress.

5.3.14 Two solutions that could deliver an increase in the number of approach lanes along High St are: removing the dedicated bus lane as it approaches the junction and using for general traffic; or implement some localised widening to the southbound carriageway and still including the bus lane.

5.3.15 An indicative scheme cost for bus lane removal could be modest at c.£50,000. For the alternative widening option the cost could increase substantially to something in the order of £200,000 to £500,000 depending on extent of works and any diversion of statutory undertakers.

Monarch's Way (A121) / Abbey Rd (A1010) [PACKAGE 5 ONLY]

5.3.16 The existing junction is a partially-signalised roundabout. By fully signalising all approaches to the roundabout sufficient additional capacity should be created to relieve network stress as a result of the package's quantum of development.

5.3.17 An indicative cost for the signalisation work would be c.£250,000.

5.4 Indicative interventions - links

5.4.1 As previously described, several of the link stress points are as a direct consequence of poor junction performance. Therefore it is expected that if the junction improvements above were to be implemented then link performance could be improved as a consequence. Furthermore, several link stress points are predicted to be operating close to, but within, capacity and so are not thought to require any intervention.

A10 north of A414 [ALL PACKAGES]

5.4.2 Whilst this link is being shown as being under pressure it is not at a level where a specific intervention is required. Whilst busy, the link is estimated to be operating within acceptable operational levels – even assuming the 'worst case' flows that this analysis is based on.

A414 eastbound between A10 and A1170 [ALL PACKAGES]

5.4.3 Pressure is experienced on this link due to capacity constraints as it approaches the A1170 junction. Through localised improvements to the junction this link capacity issue should be resolved. The proposed intervention would be for a partial signalisation scheme to be implemented – most likely just on the A414 eastbound approach.

5.4.4 An indicative cost for the signalisation work would be c.£250,000.

A414 westbound between B182 and A1170 [ALL PACKAGES]

5.4.5 Whilst this link is being shown as being under pressure it is not at a level where a specific intervention is required. Whilst busy, the link is estimated to be operating within acceptable operational levels – even assuming the 'worst case' flows that this analysis is based on.

Hertford Road [PACKAGES 3 and 5]

5.4.6 Hertford Road is predicted to be operating close to, but within, capacity under packages 3 and 5. As such it is thought to need require any specific intervention. However as the key access route to/from the West of Hoddesdon development it may be beneficial to improve the quality of the highway (surfacing, alignment, side junctions, pedestrian crossing facilities) as it is relatively poor compared to other comparable links in the Borough. An indicative cost for such work could be in the order of c.£150,000.

A10 between Hoddesdon and Turnford [PACKAGES 2 to 5]

5.4.7 Whilst this link is being shown as being under pressure it is not at a level where a specific intervention is required. Assuming 'worst case' flows the link is estimated to be operating within capacity and so no specific intervention is proposed.

B156 corridor (Goff's Lane)

5.4.8 The B156 corridor is predicted to see significant increases in flow even without Core Strategy development. It is believed that this is due to the fact that the B156 is the first east-west route north of the M25 and is likely to be used an alternative when the motorway becomes increasingly congested in future years.

5.4.9 An option to increase capacity would be to widen Goff's Lane at key locations so that it is two lanes in each direction; however given the likely cause of pressure in the corridor such an approach would most likely only lead to increased vehicle flows and no overall change in network stress.

5.4.10 A more preferable solution would be locally manage particular hotspots and implement demand-based interventions in the immediate area (particularly the Goff's Oak development and also Brookfield) in order to limit additional traffic generation at source. Particular, localised interventions could include highway realignment where problematic and minor junction re-modelling to enhance efficiency and safety.

5.4.11 Indicative intervention costs could be relatively modest for highway works depending on what was done – c.£200,000. The cost of implementing demand-based interventions would depend on specific schemes although broad costs are outlined in section 5.5 below.

A10 between Park Plaza West and Lt. Ellis Way + Lt. Ellis Way northbound towards Goff's Lane [PACKAGES 3 to 5]

5.4.12 For packages 3 and 4, these links are being shown as being under but still operating within capacity – therefore no specific intervention are proposed. However for package 5 the level of stress is estimated to be sufficiently higher to require potentially require intervention. It should be noted that such an intervention is being considered using the 'worst case' flows estimated this study and assuming full build out of the Park Plaza West office development.

5.4.13 If this were to happen then there may be a need for an additional lane to be provided northbound on the A10 between the Park Plaza West development to Lt. Ellis Way junction and consequent improvements to the Lt. Ellis Way roundabout. In addition, junction improvements already highlighted at the Lt. Ellis Way / Goff's Lane (B156) roundabout would also be required. An indicative cost for the A10 widening and improvements to the Lt. Ellis Way roundabout is c.£750,000.

A10 between M25 J25 and Park Plaza West [PACKAGE 5]

5.4.14 Whilst this link is being shown as being under pressure it is not at a level where a specific intervention is required. Assuming 'worst case' flows the link is estimated to be operating within capacity and so no specific intervention is proposed.

5.5 Non-highway

5.5.1 As described at the start of the chapter, there are a wide range of interventions that can be implemented that are not focussed on increasing capacity on the highway network. Below is a summary of other interventions that could be usefully introduced in parallel with new development in the Borough. The successful delivery of non-highway schemes based on the examples listed below has the potential to reduce existing car mode shares and therefore to possibly delay, reduce, and ultimately remove the need for costly highways interventions to be undertaken.

- enhance existing bus services to provide a high frequency core service along the A1170 (eg between Enfield and Ware via Waltham Cross, Cheshunt, Broxbourne, Hoddesdon) [c.£150,000 for each new bus required plus wider scheme marketing and promotion costs if applicable];
- enhance existing bus services to provide a stronger east-west corridor between Cuffley and Waltham Abbey (possibly via Brookfield) [c.£150,000 for each new bus required plus wider scheme marketing and promotion costs if applicable];
- refurbishment of existing bus stop infrastructure including stops, shelters, signage and real-time information [c.£5,000 for each bus stop + c.£200,000 for real-time information system];
- refurbishment of existing rail stations (eg Broxbourne) with improved walk/cycle access, and additional cycle parking [in the order of £50,000 for each station re-furbished];
- creation of safe walking and cycling networks that link key attractors in the Borough using less-trafficked routes – improving the A10 junctions at Church Lane and College Road are particularly important in this respect [c.£75,000 for signage, marketing and minor highways works - excluding A10 junctions];
- review public car parking arrangements (supply of spaces, tariffs, etc.) as part of a Borough-wide car parking review [£50,000 for investigative study];
- restricting the availability of residential and/or workplace parking at new developments [£minimal – depends on ability to influence planning policy and set planning consent conditions];

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- 'Smarter Choices' measures that could include: car clubs and car sharing; area-based travel planning (homes, workplaces, schools, destinations – eg Brookfield); and flexible working hours and home working [£minimal – delivery of measures undertaken as integral part of new development]

6 Conclusions

6.1 Impact of Package 1 (Baseline)

6.1.1 Analysis of Package 1 (Baseline) highlights a number of locations where the Borough's highway network is likely to be stressed without any Core Strategy development. One of the recommendations of this Report is for an A10 Route Management Strategy to be undertaken which would help in fully understanding what the constraints and opportunities are at a number of key locations.

6.1.2 One of the objectives of the proposed Route Management Strategy (RMS) should be to help to 'unlock' potential problem areas and enable Core Strategy development to continue without causing undue additional congestion and delay. Junctions of particular concern are A10/Church Lane and A10/College Road which could both benefit from a comprehensive re-design that considers the needs of all users, not just motorised vehicles.

6.1.3 M25 Junction 25 is also anticipated to be operating at, or close to, capacity and would require collaboration between BBC, the Highways Agency, and other appropriate Authorities and Organisations to implement successful longer-term solution(s).

6.1.4 Without intervention at these Baseline hot-spots it could be expected that additional Core Strategy development will worsen conditions leading to increased congestion and delay being experienced.

6.2 Impact of Package 2 (Core Strategy development)

6.2.1 Compared to no development (ie baseline), the traffic impact of the Core Strategy in isolation is anticipated to be relatively modest. It does however add additional stress to locations that are already close to, or at, capacity in the Baseline package. New network stress is introduced to in several locations but the respective links/junctions are predicted to be still operating within capacity.

6.2.2 Assuming that the Baseline network hot spots can be successfully mitigated, the Core Strategy (committed schemes, SHLAA, Brookfield, and Park Plaza North) should be able to be delivered without substantial additional mitigation on the Borough's core transport network. There will however be a need to improve highway infrastructure in the area immediately surrounding the larger development sites (eg new access from Brookfield onto A10 at Turnford).

6.2.3 The benefits of a package of 'Smarter Choices' measures should not be overlooked in helping to reduce vehicle trip generation in all new development and thus assist in limiting additional flow and stress being placed on the highway network.

6.3 Impact of Package 3 (West of Hoddesdon development)

6.3.1 Compared with Package 2 (Core Strategy development only), the inclusion of the development to the West of Hoddesdon in Package 3 leads to new, additional stress being placed on the highway network at Hertford Road and on the A10 to the south of Lt. Ellis Way. Development at West of Hoddesdon also worsens the performance of the A10 between

Hoddesdon and Turnford. Additional pressure is also being placed on junctions that are already operating beyond capacity in the Baseline (P1) and Core Strategy (P2) packages.

6.4 Impact of Package 4 (Goff's Oak development)

6.4.1 Compared with Package 2 (Core Strategy development only), the inclusion of the development at Goff's Oak in Package 4 is predicted to lead to new, additional stress being placed on the highway network on the A10 south of Lt. Ellis Way and also a worsening of performance on the A10 between Hoddesdon and Turnford.

6.5 Impact of Package 5 (Maximum development)

6.5.1 Maximum development as modelled in Package 5 places the most pressure on the highway network. All the issues outlined in previous packages also apply to this Package with the addition of link stress on the A10 between M25 J25 and the Park Plaza West access. This is a direct consequence of the Park Plaza West office development which places substantial additional flow in the immediate surrounding area. This includes M25 Junction 25, particularly in the PM peak period.

6.6 Interventions

6.6.1 The most significant improvements identified are to the at-grade, signalised A10 junctions at College Road and Church Lane and M25 J25 depending on the quantum of development introduced at Park Plaza West. These interventions would cost substantial sums to implement.

6.6.2 More modest junction improvements may be required at Lt. Ellis Way (B198) / Goff's Lane (B156) roundabout, Winston Churchill Way (A121) / High St (B176) roundabout, Monarch's Way (A121) / Abbey Rd (A1010) roundabout, and the western approach of the A414 / A1170 roundabout. The cost of these interventions could still be substantial but are significantly less than those outlined above.

6.6.3 Finally, Goff's Lane and Hertford Road could also benefit from localised improvements in order to manage specific congestion and safety hot-spots. Interventions such as these could be undertaken for relatively modest sums.

6.6.4 It is very important to note that there is potential for encouraging mode shift from the private car to other more sustainable modes. From a highway performance perspective there is clear benefit in terms of reduced highway flows, congestion, and delays. Promoting 'demand-based' interventions that reduce generated traffic flows at source should be a key component of the Core Strategy's transport solution – in parallel with specific, localised highway improvements that address key hotspots. Non-highway interventions are also key to delivering Core Strategy development by creating an environment which promotes and encourages non-car travel, be it by public transport, walking, or cycling.

6.6.5 Indicative cost estimates for these interventions range in scale from modest to more substantial sums but could be, in general terms, a fraction of the cost of undertaking a major highway scheme.

6.7 Regional Spatial Strategy Abolition

6.7.1 It was announced by the incoming Government in July 2010 that Regional Spatial Strategies (RSSs) were to be abolished – including housing targets that are specified for each Borough.

6.7.2 The analysis undertaken for this study has assumed no change to the development quantums as supplied by BBC. As a consequence it is possible that the quantum of development assumed for the Core Strategy (P2 and variants P3 to P5) may differ from what is actually approved and constructed. Assuming that actual build-out rates are lower than planned for in the RSS then the impact on the highway network will be less. This could mean that the need for particular interventions is delayed by a number of years or that they are not required at all.

6.7.3 Furthermore, the abolition of RSS housing targets could have an impact on the level of future year growth that occurs in authorities beyond Broxbourne. This could have the effect of reducing 'baseline' traffic conditions (ie Package 1) such that particular hot spots in the highway network are reduced in impact and/or removed completely. This could ultimately result in revised highway-based interventions being required – in terms of necessity, scale, and phasing.

6.7.4 Further testing would be required using revised development assumptions in order to properly understand the likely impact of revised housing and employment growth in the Borough.

6.8 Final summary

6.8.1 MVA Consultancy have assessed the transport impact of Broxbourne Borough Council's Core Strategy development using a spreadsheet-based approach in combination with results obtained from HIIS (Hertfordshire Infrastructure Investment Strategy). This combined spreadsheet + SATURN method enables the modelling work to take into account congestion impacts, multiple route choice, future traffic growth, network capacity (with/without interventions), and sensitivity tests concerning access arrangements.

6.8.2 The approach undertaken has been approved by the local planning authority and the highway authority and they are taking an active role in ensuring that the study methodology continues to be sound and that the outputs are credible and robust for the purposes of supporting the Core Strategy. Information from this study has also been shared with the Highways Agency.

6.8.3 The study has considered a number of future development scenarios and packages and has identified locations of highway 'stress' that could lead to poor network performance. Indicative interventions have been proposed to address those areas under stress with other non-car interventions proposed to encourage and promote non-car trips to be made.

6.8.4 Added-value could be provided by undertaking further pieces of analysis that build on this study:

- conducting a detailed A10 Route Management Strategy that investigates in detail what interventions are required to junctions in the A10 corridor;

- investigating interventions at the at-grade A10 junctions (Church Lane and College Road) with a view to improving conditions and safety for all road users, in particular pedestrians and cyclists – reflecting the different nature of this section of the A10 corridor and the ability to substantially improve the quality of the public realm; and
- if required, conducting additional scenario/package runs that consider revised development quantums that reflect differing assumptions post-RSS abolishment.

Appendices

Appendix 1 – Trip Generation

Total person trip rates

Land Use	Measure	AM Inbound	AM Outbound	PM Inbound	PM Outbound
B1 Office	per 100m^2	1.952	0.116	0.123	1.767
B2/B8 Industry	per 100m^2	0.535	0.196	0.133	0.442
A1/A3 Retail	per 100m^2	0.746	0.378	1.500	2.100
C1 Hotel	per room	0.110	0.323	0.300	0.156
D1/D2 Leisure	per 100m^2	0.183	0.192	1.797	1.158
Residential	per dwelling	0.21*	0.66*	0.31*	0.19*

AM peak period = 8-9am
PM peak period = 5-6pm

* residential land use trip rates are calculated from first principles

Total person trips

Land Use	AM Inbound	AM Outbound	PM Inbound	PM Outbound	TOTAL
S2 Core Strategy	1,300	1,700	1,700	1,900	6,600
S3 Edge of Urban	100	200	100	100	400
S4 West of Hoddesdon	200	700	300	200	1400
S5 West of Hoddesdon	200	700	300	200	1,400
S6 Goff's Oak	200	700	300	200	1,400
S7 Maxwells Farm West	500	200	100	400	1,300
S8 Park Plaza West	1,900	100	100	1,800	4,000
P2 Core Strategy	1,300	1,700	1,700	1,900	6,600
P3 West of Hoddesdon	1,600	2,600	2,100	2,200	8,400
P4 Goff's Oak	1,600	2,600	2,100	2,200	8,400
P5 Maximum	4,200	3,600	2,600	4,600	15,000

AM peak period = 8-9am
PM peak period = 5-6pm

Appendix 2 – Trip Distribution

Total distribution profiles (rounded to nearest %)

Model Zone	To/from North Broxbourne	To/from South Broxbourne	To/from West Broxbourne
North Broxbourne	36%	4%	5%
South Broxbourne	6%	34%	13%
West Broxbourne	2%	3%	23%
TOTAL 'Local'	**44%**	**41%**	**41%**
Enfield	6%	16%	14%
Welwyn Hatfield	3%	3%	4%
East Hertfordshire	16%	5%	7%
Harlow	3%	1%	1%
Epping Forest	3%	3%	2%
TOTAL 'Neighbouring'	**31%**	**28%**	**28%**
Strategic South	8%	11%	11%
Strategic West	6%	8%	8%
Strategic North	5%	6%	6%
Strategic East	4%	5%	5%
TOTAL 'Strategic'	**23%**	**30%**	**30%**

Total distribution totals (scenarios)

Model Zone	S2	S3	S4	S5	S6	S7	S8
North Broxbourne	8%	3%	61%	61%	3%	5%	5%
South Broxbourne	17%	60%	3%	3%	8%	31%	31%
West Broxbourne	43%	2%	1%	1%	53%	15%	15%
TOTAL 'Local'	**68%**	**64%**	**66%**	**66%**	**64%**	**51%**	**51%**
Enfield	6%	10%	4%	4%	8%	11%	11%
Welwyn Hatfield	2%	2%	2%	2%	3%	2%	2%
East Hertfordshire	5%	3%	10%	10%	4%	6%	6%
Harlow	1%	1%	2%	2%	1%	2%	2%
Epping Forest	3%	2%	2%	2%	1%	8%	8%
TOTAL 'Neighbouring'	**18%**	**17%**	**20%**	**20%**	**17%**	**30%**	**30%**
Strategic South	5%	7%	5%	5%	7%	7%	7%
Strategic West	4%	5%	4%	4%	5%	5%	5%
Strategic North	3%	4%	3%	3%	4%	4%	4%
Strategic East	2%	3%	2%	2%	3%	3%	3%
TOTAL 'Strategic'	**14%**	**18%**	**14%**	**14%**	**18%**	**19%**	**19%**

Total distribution totals (packages)

Model Zone	P2	P3	P4	P5
North Broxbourne	8%	16%	7%	11%
South Broxbourne	17%	17%	18%	21%
West Broxbourne	43%	34%	43%	29%
TOTAL 'Local'	**68%**	**68%**	**67%**	**62%**
Enfield	6%	6%	7%	8%
Welwyn Hatfield	2%	2%	2%	2%
East Hertfordshire	5%	6%	5%	6%
Harlow	1%	1%	1%	2%
Epping Forest	3%	3%	3%	5%
TOTAL 'Neighbouring'	**18%**	**18%**	**18%**	**22%**
Strategic South	5%	5%	5%	6%
Strategic West	4%	4%	4%	4%
Strategic North	3%	3%	3%	3%
Strategic East	2%	2%	2%	3%
TOTAL 'Strategic'	**14%**	**14%**	**15%**	**16%**

Appendix 3 – Trip Mode Share

AM peak period trip mode shares

Land Use	Car	Bus	Rail	Walk	Cycle
S2 Core Strategy	71%	9%	3%	14%	2%
S3 Edge of Urban	65%	11%	3%	18%	2%
S4 West of Hoddesdon	64%	11%	4%	19%	2%
S5 West of Hoddesdon	64%	11%	4%	19%	2%
S6 Goff's Oak	64%	11%	5%	18%	2%
S7 Maxwells Farm West	87%	4%	2%	5%	2%
S8 Park Plaza West	87%	4%	2%	5%	2%
P2 Core Strategy	71%	9%	3%	14%	2%
P3 West of Hoddesdon	70%	9%	3%	15%	2%
P4 Goff's Oak	69%	9%	4%	15%	2%
P5 Maximum	75%	8%	3%	12%	2%

AM peak period = 8-9am

High walk share due to education trips

PM peak period trip mode shares

Land Use	Car	Bus	Rail	Walk	Cycle
S2 Core Strategy	82%	6%	4%	6%	2%
S3 Edge of Urban	82%	5%	8%	3%	2%
S4 West of Hoddesdon	80%	5%	8%	6%	2%
S5 West of Hoddesdon	80%	5%	8%	6%	2%
S6 Goff's Oak	79%	5%	10%	4%	2%
S7 Maxwells Farm West	87%	4%	2%	5%	2%
S8 Park Plaza West	87%	4%	2%	5%	2%
P2 Core Strategy	82%	6%	4%	6%	2%
P3 West of Hoddesdon	82%	6%	5%	6%	2%
P4 Goff's Oak	82%	6%	5%	5%	2%
P5 Maximum	83%	5%	4%	5%	2%

PM peak period = 5-6pm

AM peak period trips by mode

Land Use	Car	Bus	Rail	Walk	Cycle
S2 Core Strategy	2,130	270	100	420	70
S3 Edge of Urban	170	30	10	50	10
S4 West of Hoddesdon	560	90	30	170	20
S5 West of Hoddesdon	560	90	30	170	20
S6 Goff's Oak	560	100	40	160	20
S7 Maxwells Farm West	640	30	10	40	10
S8 Park Plaza West	1,800	90	40	100	40
P2 Core Strategy	2,130	270	100	420	70
P3 West of Hoddesdon	2,870	390	140	630	90
P4 Goff's Oak	2,860	390	150	630	90
P5 Maximum	5,860	600	230	930	160

AM peak period = 8-9am

High walk share due to education trips

PM peak period trips by mode

Land Use	Car	Bus	Rail	Walk	Cycle
S2 Core Strategy	2,960	210	150	210	80
S3 Edge of Urban	120	10	10	10	0
S4 West of Hoddesdon	400	20	40	30	10
S5 West of Hoddesdon	400	20	40	30	10
S6 Goff's Oak	400	30	50	20	10
S7 Maxwells Farm West	500	20	10	30	10
S8 Park Plaza West	1,640	80	30	90	40
P2 Core Strategy	2,960	210	150	210	80
P3 West of Hoddesdon	3,480	240	200	240	90
P4 Goff's Oak	3,480	240	210	230	90
P5 Maximum	6,020	370	300	380	140

PM peak period = 5-6pm

Appendix 4 – Trip Assignment

Weighted routing splits to TAM model zones

Enfield

- via A10 – 80%
- via A1010 – 20%

Welwyn Hatfield

- via Cuffley – 70%
- via northern rural routes – 30%

East Hertfordshire

- via B1197 (Hertford) – 20%
- via A10 (Hertford and rural hinterland) – 80%

Harlow

- via A414 – 75%
- via Essex Road – 15%
- via Nazeing Road – 10%

Epping Forest

- via M25 – 70%
- via A112 – 10%
- via A121 – 20%

Appendix 5 – TAM example screenshots

Trip Generation - input

GENERIC DATA

Regional trip rate variations (by Government Office Regions)

1998/2000	Total trips per person per year	Factor	
North East		0.00	
North West		0.00	
Yorkshire		0.00	
East Midlands		0.00	
West Midlands		0.00	
East England		0.00	
London		0.00	
South East	1084	1.00	Data taken from Regional Transport Statistics: 2006 Edition Ch.1 Personal Travel Table 1.1. SE Region selected.
South West		0.00	
England Average	1084	1.00	

Number of days per year that each trip purpose can be undertaken

	No. of days	
In a year	365	Standard values
Bank and publics holidays	8	Standard values
Weekends	104	Standard values
School week	36	Standard values
Education	180	
Work	253	
Shopping, other	261	

Growth factors

Mode	2008-TBC		Data added from Tempro version 5.1
	AM	PM	
Car Driver	1.000	1.000	Not used
Car Passenger	1.000	1.000	Not used
Driver / Pass Ave	**1.000**	**1.000**	

Car trip occupancy

	Work	Education	
AM peak	1.2	2	Standard values
PM peak	1.2	2	Standard values

TRIP DATA

Socio-economic trip rate variations

ACORN hhd 1996/2000	Trips per person per year				
Trip Purpose	All hhd	Family areas	T and C areas	Factor	
Commuting, business, education	264	320	283	1.00	All h'hold data taken from NTS 2005 Table 4.1
Escort	145	173	154	1.00	All h'hold data taken from NTS 2005 Table 4.1
Shopping, personal business	315	306	309	1.00	All h'hold data taken from NTS 2005 Table 4.1
Leisure	320	340	324	1.00	All h'hold data taken from NTS 2005 Table 4.1

Socio-Economic area type proportions

Area Type	Propn	
All Household	100%	Standard values
Well Off Workers Family Areas	0%	Standard values
Affluent Urbanites Town and City Areas	0%	Standard values

Trip rate data

	Person trips by trip purpose (1999/2001)								Annual average daily	AM peak (weekday)		PM peak (weekday)		AM peak		PM peak	
Trip purpose	Trips per person for use in model	ACORN factor	Regional variation	All week trip propns	Weekday trip propns	Weekday factor	Annual average tpp (weekday only)	Nb of days per year	Trips per person per day	Factor	Trips per person per hour	Factor	Trips per person per hour	In	Out	In	Out
Commuting	161	1.00	1.00	104	91	0.88	141	253	0.56	0.17	0.09	0.14	0.08	24%	76%	62%	38%
Business	37	1.00	1.00	24	22	0.92	34	253	0.13	0.09	0.01	0.08	0.01	24%	76%	62%	38%
Education	66	1.00	1.00	42	42	1.00	66	180	0.37	0.36	0.13	0.03	0.01	24%	76%	62%	38%
Escort education	48	1.00	1.00	29	29	1.00	48	180	0.27	0.29	0.08	0.01	0.00	24%	76%	62%	38%
Shopping	206	1.00	1.00	148	95	0.64	132	261	0.51	0.02	0.01	0.06	0.03	24%	76%	62%	38%
Other escort	97	1.00	1.00	55	40	0.73	71	261	0.27	0.035	0.01	0.04	0.01	24%	76%	62%	38%
Other personal business	109	1.00	1.00	162	143	0.88	96	261	0.37	0.035	0.01	0.04	0.01	24%	76%	62%	38%
Visit friends home	123	1.00	1.00	99	56	0.57	70	261	0.27	0.02	0.01	0.08	0.02	24%	76%	62%	38%
Visit friends elsewhere	47	1.00	1.00	32	17	0.53	25	261	0.10	0.00	0.00	0.04	0.00	24%	76%	62%	38%
Entertainment / sport	69	1.00	1.00	42	26	0.62	43	261	0.16	0.02	0.00	0.08	0.01	24%	76%	62%	38%
Holiday / day trip	39	1.00	1.00	21	11	0.52	20	261	0.08	0.02	0.00	0.08	0.01	24%	76%	62%	38%
Other (walking)	42	1.00	1.00	31	19	0.61	26	261	0.10	0.05	0.00	0.06	0.01	24%	76%	62%	38%
	NTS 2005 Table 4.1			FOPT 2001 Table 7.6						FOPT 2001 Table 7.13 (AM+PM)				Taken from TRICS analysis of AM/PM trip rates			
												Copy across <<<< as required					

Number of local Primary and Secondary children (used for proportion only)

	Number	Children/Total Pop
No. Primary School Children (4-11)	51	7%
No. Secondary school Children (11-16)	58	8%
Total No of School Children	**109**	

Development attraction trip rates per m2

		AM Peak		PM Peak		
Development	GFA	Inbound	Outbound	Inbound	Outbound	Source
B1	0	1.952	0.116	0.123	1.767	Wembley
B2/B8	0	0.535	0.196	0.133	0.442	Wembley
Other						Wembley
Total	**0**					

From 'TRICS(Thurrock) v2.xls'

Person trip totals

AM Peak		PM Peak		
Inbound	Outbound	Inbound	Outbound	
0	0	0	0	
0	0	0	0	
0	0	0	0	
0	0	0	0	Total (attracted)
63	199	93	57	Residential trips (from GeneratedTrips!)
63	199	93	57	**Total**

Attracted Education Trips (no. of school places attracting trips from external to MDA)

No. Primary School Children (4-11)	0	Assumed to be zero
No. Secondary school Children (11-16 + 6th Form)	0	Assumed to be zero
Total No of School Children	0	

Trip Distribution - input

ZONAL / POPULATION DATA

Population, distance and trip distribution data

ZONES	Resident Popn	Distance	Manual entry of gen work trips dist?	Manual entry of attr work trips dist?	Distn of gen work trips	Distn of gen primary sch trips	Distn of gen secondary sch trips	Distn of attr work trips	Distn of attr primary sch trips	Distn of attr secondary sch trips
Development ward	720		Y	Y	0%			0%		
Local Zones :										
North Broxbourne			Y	Y	4%			5%		
South Broxbourne			Y	Y	34%	100%	100%	31%	100%	100%
West Broxbourne			Y	Y	3%			15%		
Enfield			Y	Y	16%			11%		
Welwyn Hatfield			Y	Y	3%			2%		
East Herts			Y	Y	5%			6%		
Harlow			Y	Y	1%			2%		
Epping Forest			Y	Y	3%			8%		
Strategic S			Y	Y	11%			7%		
Strategic W			Y	Y	8%			5%		
Strategic N			Y	Y	6%			4%		
Strategic E			Y	Y	5%			3%		
Total					100%	100%	100%	100%	100%	100%

Generated (Res)			Attracted (Work)		
1	**2**	**3**	**1**	**2**	**3**
36%	4%	5%	41%	5%	5%
6%	34%	13%	5%	31%	6%
2%	3%	23%	8%	15%	66%
6%	16%	14%	2%	11%	3%
3%	3%	4%	1%	2%	2%
16%	5%	7%	16%	6%	6%
3%	1%	1%	6%	2%	1%
3%	3%	2%	5%	8%	2%
8%	11%	11%	6%	7%	3%
6%	8%	8%	4%	5%	2%
5%	6%	6%	3%	4%	2%
4%	5%	5%	3%	3%	1%

See "Broxbourne Travel to Work Data v3c.xls"/'BroxbourneResLAPivot'!

Trip Mode Share - input

Generated Trips Mode Share

	Work						Primary Education						Secondary Education					
Destination	**Car**	**Bus**	**Rail**	**Walk**	**Cycle**	**Tube**	**Car**	**Bus**	**Rail**	**Walk**	**Cycle**	**Other**	**Car**	**Bus**	**Rail**	**Walk**	**Cycle**	**Other**
MDA Internal																		
Local Zones :																		
North Broxbourne	81%	8%	1%	7%	3%	0%												
South Broxbourne	85%	8%	1%	3%	3%	0%	70%	5%	0%	25%	0%	0%	35%	25%	0	35%	5%	0%
West Broxbourne	91%	1%	4%	3%	1%	0%												
Enfield	91%	4%	3%	0%	2%	0%												
Welwyn Hatfield	94%	3%	1%	0%	2%	0%												
East Herts	94%	1%	2%	2%	1%	0%												
Harlow	95%	0%	5%	0%	0%	0%												
Epping Forest	94%	4%	1%	0%	1%	0%												
Strategic S	76%	1%	23%	0%	0%	0%												
Strategic W	76%	1%	23%	0%	0%	0%												
Strategic N	76%	1%	23%	0%	0%	0%												
Strategic E	76%	1%	23%	0%	0%	0%												

Attracted Trips Mode Share

	Work						Primary Education						Secondary Education					
Origin	**Car**	**Bus**	**Rail**	**Walk**	**Cycle**	**Other**	**Car**	**Bus**	**Rail**	**Walk**	**Cycle**	**Other**	**Car**	**Bus**	**Rail**	**Walk**	**Cycle**	**Other**
MDA Internal																		
Local Zones :																		
North Broxbourne	90%	3%	1%	3%	2%													
South Broxbourne	78%	5%	0%	14%	3%		70%	5%	0%	25%	0%	0%	35%	25%	0	35%	5%	0%
West Broxbourne	87%	5%	4%	3%	1%													
Enfield	82%	13%	5%	0%	0%													
Welwyn Hatfield	97%	0%	0%	0%	3%													
East Herts	98%	1%	1%	0%	0%													
Harlow	100%	0%	0%	0%	0%													
Epping Forest	92%	2%	0%	0%	6%													
Strategic S	95%	1%	3%	0%	1%													
Strategic W	95%	1%	3%	0%	1%													
Strategic N	95%	1%	3%	0%	1%													
Strategic E	95%	1%	3%	0%	1%													

Trip Assignment (extract) - input

		North					East					South				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Zone		North_A	North_B	North_C	North_D	North_E	East_A	East_B	East_C	East_D	East_E	South_A	South_B	South_C	South_D	South_E
% Routing		33%	33%	33%			33%	33%	33%			33%	33%	33%		
% Total				100%					100%					100%		
INPUT PATH FROM DEVELOPMENT TO EACH DEST	1st	130	80	92			130	80	92			130	80	92		
	2nd	87	75	89			87	84	94			87	84	94		
	3rd	89	53	83			94	90	104			94	90	104		
	4th	83	43	75			104	94	109			104	94	112		
	5th	75	27	53			109	104				112	104			
	6th	53	15	43				109					112			
	7th	43	7	27												
	8th	27	1	15												
	9th	15		7												
	10th	7		1												
	11th	1														
	12th															
	13th															
	14th															
	15th															
	16th															
	17th															
	18th															
	19th															
	20th															

AM Peak

	Link		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Zone #	**Zone Name**																																									
1	BroxN																						163		163				163													
2	BroxS																																									
3	BroxW																																									
4	Enfield																																									
5	WelHat																																									
6	EastHerts		17						17					18		18	17		18									18	17		18				18				18		18	
7	HARLOW				3		3		3								3						3		3		3		5					3			3		3		3	
8	EPPING																																									
9	S																																									
10	W																																									
11	N		8						8								8												8													
12	E																																									
			25	0	3	0	3	0	28	0	0	0	0	18	0	18	28	0	18	0	0	0	166	0	166	0	3	18	194	0	18	0	0	3	18	0	3	0	21	0	21	0

PM Peak

	Link		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Zone #	**Zone Name**																																									
1	BroxN																						45		45				45													
2	BroxS																																									
3	BroxW																																									
4	Enfield																																									
5	WelHat																																									
6	EastHerts		11						11					12		12	11		12									12	11		12				12				12		12	
7	HARLOW				2		2		2								2						2		2		2		3					2			2		2		2	
8	EPPING																																									
9	S																																									
10	W																																									
11	N		5						5								5												5													
12	E																																									
			16	0	2	0	2	0	17	0	0	0	0	12	0	12	17	0	12	0	0	0	46	0	46	0	2	12	64	0	12	0	0	2	12	0	2	0	13	0	13	0

Residential trips – output

Generated trips calculations

Proportion inbound and outbound trips by peak and purpose

Trip purpose	Development trips			AM Peak		PM Peak		AM Peak		PM Peak		Educn?
	All day	AM	PM	in	out	in	out	in	out	in	out	
Commuting	401	68	56	24%	76%	62%	38%	16	52	35	21	0
Business	97	9	8	24%	76%	62%	38%	2	7	5	3	0
Education	264	95	8	24%	76%	62%	38%	23	72	5	3	1
Escort education	192	56	2	24%	76%	62%	38%	13	42	1	1	1
Shopping	365	7	22	24%	76%	62%	38%	2	6	14	8	0
Other escort	195	7	8	24%	76%	62%	38%	2	5	5	3	0
Other personal business	265	9	11	24%	76%	62%	38%	2	7	7	4	0
Visit friends home	192	4	15	24%	76%	62%	38%	1	3	10	6	0
Visit friends elsewhere	69	0	3	24%	76%	62%	38%	0	0	2	1	0
Entertainment / sport	118	2	9	24%	76%	62%	38%	1	2	6	4	0
Holiday / day trip	56	1	5	24%	76%	62%	38%	0	1	3	2	0
Other (walking)	71	4	4	24%	76%	62%	38%	1	3	3	2	0
All purposes	2284	262	150					63	199	93	57	

Generated education trips

	%	All Day	Total		AM Peak		PM Peak	
			AM	PM	In	Out	In	Out
No. Primary School Children (4-11)	47%	212	70	5	17	53	3	2
No. Secondary school Children (11-16)	53%	244	81	5	19	61	3	2
Total No of School Children	100%	456	151	10	36	115	6	4

Summary of generated trips

Trip purpose		Total		AM Peak		PM Peak	
	All Day	AM	PM	In	Out	In	Out
Work	1828	111	140	27	84	87	53
Education	456	151	10	36	115	6	4
All purposes	2284	262	150	63	199	93	57

Distribution of generated work trips by zone

Destination	Popn	Dist Km	Popn / dist ^{2}	Initial Distn	Distn
MDA Internal	720	0.0	0	0%	0%
Local Zones :					
North Broxbourne	0	0.0	0	4%	4%
South Broxbourne	0	0.0	0	34%	34%
West Broxbourne	0	0.0	0	3%	3%
Enfield	0	0.0	0	16%	16%
Welwyn Hatfield	0	0.0	0	3%	3%
East Herts	0	0.0	0	5%	5%
Harlow	0	0.0	0	1%	1%
Epping Forest	0	0.0	0	3%	3%
Strategic S	0	0.0	0	11%	11%
Strategic W	0	0.0	0	8%	8%
Strategic N	0	0.0	0	6%	6%
Strategic E	0	0.0	0	5%	5%
Total	720		0	100%	100%

Distribution of work generated trips by direction, zone and mode

Destination	AM PEAK												AM		PM PEAK												PM	
	Car		Bus		Rail		Walk		Cycle		Other		Total		Car		Bus		Rail		Walk		Cycle		Other		Total	
	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out
MDA Internal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Local Zones :																												
North Broxbourne	1	3	0	0	0	0	0	0	0	0	0	0	1	3	3	2	0	0	0	0	0	0	0	0	0	0	4	2
South Broxbourne	8	24	1	2	0	0	0	1	0	1	0	0	9	29	25	15	2	1	0	0	1	1	1	1	0	0	30	18
West Broxbourne	1	2	0	0	0	0	0	0	0	0	0	0	1	2	2	1	0	0	0	0	0	0	0	0	0	0	2	2
Enfield	4	13	0	1	0	0	0	0	0	0	0	0	4	14	13	8	1	0	0	0	0	0	0	0	0	0	14	9
Welwyn Hatfield	1	2	0	0	0	0	0	0	0	0	0	0	1	2	2	1	0	0	0	0	0	0	0	0	0	0	2	1
East Herts	1	4	0	0	0	0	0	0	0	0	0	0	1	4	4	3	0	0	0	0	0	0	0	0	0	0	4	3
Harlow	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	1	1
Epping Forest	1	2	0	0	0	0	0	0	0	0	0	0	1	2	2	1	0	0	0	0	0	0	0	0	0	0	3	2
Strategic S	2	7	0	0	1	2	0	0	0	0	0	0	3	9	7	4	0	0	2	1	0	0	0	0	0	0	10	6
Strategic W	2	5	0	0	0	2	0	0	0	0	0	0	2	7	5	3	0	0	2	1	0	0	0	0	0	0	7	4
Strategic N	1	4	0	0	0	1	0	0	0	0	0	0	2	5	4	2	0	0	1	1	0	0	0	0	0	0	5	3
Strategic E	1	3	0	0	0	1	0	0	0	0	0	0	1	4	3	2	0	0	1	1	0	0	0	0	0	0	4	3
Total	22	71	1	4	2	7	0	1	0	1	0	0	27	84	73	45	4	2	7	4	1	1	1	1	0	0	87	53

Distribution of primary school generated trips by direction, zone and mode

Destination	AM PEAK												AM		PM PEAK												PM	
	Car		Bus		Rail		Walk		Cycle		Other		Total		Car		Bus		Rail		Walk		Cycle		Other		Total	
	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out
MDA Internal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Local Zones :																												
North Broxbourne	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
South Broxbourne	12	37	1	3	0	0	4	13	0	0	0	0	17	53	2	1	0	0	0	0	1	0	0	0	0	0	3	2
West Broxbourne	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Enfield	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Welwyn Hatfield	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
East Herts	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harlow	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Epping Forest	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Strategic S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Strategic W	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Strategic N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Strategic E	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	12	37	1	3	0	0			0	0	0	0	17	53	2	1	0	0	0	0	1	0	0	0	0	0	3	2

Distribution of secondary school generated trips by direction, zone and mode

Destination	AM PEAK												AM		PM PEAK												PM	
	Car		Bus		Rail		Walk		Cycle		Other		Total		Car		Bus		Rail		Walk		Cycle		Other		Total	
	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out
MDA Internal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Local Zones :																												
North Broxbourne	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
South Broxbourne	7	21	5	15	0	0	7	21	1	3	0	0	19	61	1	1	1	0	0	0	1	1	0	0	0	0	3	2
West Broxbourne	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Enfield	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Welwyn Hatfield	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
East Herts	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harlow	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Epping Forest	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Strategic S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Strategic W	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Strategic N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Strategic E	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	7	21	5	15	0	0			1	3	0	0	19	61	1	1	1	0	0	0	1	1	0	0	0	0	3	2

Other (non-residential) land use trips - output

Attracted trips calculations

Proportion inbound and outbound trips by peak and purpose

	AM Peak		PM Peak	
Development	**In**	**Out**	**In**	**Out**
B1	0	0	0	0
B2/B8	0	0	0	0
Other	0	0	0	0
Total	0	0	0	0

Attracted education trips

		Total		AM Peak		PM Peak	
		AM	**PM**	**In**	**Out**	**In**	**Out**
No. Primary School Children (4-11)	0	0	0	0	0	0	0
No. Secondary school Children (11-16)	0	0	0	0	0	0	0
Total No of School Children	0	0	0	0	0	0	0

Summary of attracted trips

	Total		AM Peak		PM Peak	
Trip purpose	**AM**	**PM**	**In**	**Out**	**In**	**Out**
Work	0	0	0	0	0	0
Education	0	0	0	0	0	0
All purposes	0	0	0	0	0	0

Distribution of attracted work trips by zone

Destination	Popn	Dist Km	Popn / dist^2	Initial Distn	Distn
MDA Internal	720	0.0	0	0%	0%
Local Zones :					
North Broxbourne	0	0.0	0	5%	5%
South Broxbourne	0	0.0	0	31%	31%
West Broxbourne	0	0.0	0	15%	15%
Enfield	0	0.0	0	11%	11%
Welwyn Hatfield	0	0.0	0	2%	2%
East Herts	0	0.0	0	6%	6%
Harlow	0	0.0	0	2%	2%
Epping Forest	0	0.0	0	8%	8%
Strategic S	0	0.0	0	7%	7%
Strategic W	0	0.0	0	5%	5%
Strategic N	0	0.0	0	4%	4%
Strategic E	0	0.0	0	3%	3%
Total	720		0	100%	100%

Distribution of work attracted trips by direction, zone and mode

	AM PEAK												AM		PM PEAK												PM	
Origin	**Car**		**Bus**		**Rail**		**Walk**		**Cycle**		**Other**		**Total**		**Car**		**Bus**		**Rail**		**Walk**		**Cycle**		**Other**		**Total**	
	In	**Out**	**In**	**Out**	**In**	**Out**	**In**	**Out**	**In**	**Out**	**In**	**Out**	**In**	**Out**	**In**	**Out**	**In**	**Out**	**In**	**Out**	**In**	**Out**	**In**	**Out**	**In**	**Out**	**In**	**Out**
MDA Internal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Local Zones :																												
North Broxbourne	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
South Broxbourne	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
West Broxbourne	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Enfield	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Welwyn Hatfield	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
East Herts	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harlow	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Epping Forest	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Strategic S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Strategic W	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Strategic N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Strategic E	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Distribution of primary school attracted trips by direction, zone and mode

	AM PEAK												AM		PM PEAK												PM	
Origin	**Car**		**Bus**		**Rail**		**Walk**		**Cycle**		**Other**		**Total**		**Car**		**Bus**		**Rail**		**Walk**		**Cycle**		**Other**		**Total**	
	In	**Out**	**In**	**Out**	**In**	**Out**	**In**	**Out**	**In**	**Out**	**In**	**Out**	**In**	**Out**	**In**	**Out**	**In**	**Out**	**In**	**Out**	**In**	**Out**	**In**	**Out**	**In**	**Out**	**In**	**Out**
MDA Internal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Local Zones :																												
North Broxbourne	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
South Broxbourne	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
West Broxbourne	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Enfield	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Welwyn Hatfield	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
East Herts	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harlow	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Epping Forest	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Strategic S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Strategic W	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Strategic N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Strategic E	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Distribution of secondary school attracted trips by direction, zone and mode

	AM PEAK												AM		PM PEAK												PM	
Origin	**Car**		**Bus**		**Rail**		**Walk**		**Cycle**		**Other**		**Total**		**Car**		**Bus**		**Rail**		**Walk**		**Cycle**		**Other**		**Total**	
	In	**Out**	**In**	**Out**	**In**	**Out**	**In**	**Out**	**In**	**Out**	**In**	**Out**	**In**	**Out**	**In**	**Out**	**In**	**Out**	**In**	**Out**	**In**	**Out**	**In**	**Out**	**In**	**Out**	**In**	**Out**
MDA Internal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Local Zones :																												
North Broxbourne	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
South Broxbourne	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
West Broxbourne	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Enfield	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Welwyn Hatfield	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
East Herts	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harlow	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Epping Forest	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Strategic S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Strategic W	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Strategic N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Strategic E	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Trips by mode – output

Mode split calculations

Total Trips by Purpose, Mode, Period and Zone

Destination	AM PEAK														PM PEAK													
	Car		Bus		Rail		Walk		Cycle		Other		Total		Car		Bus		Rail		Walk		Cycle		Other		Total	
	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out
MDA Internal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Local Zones :																												
North Broxbourne	1	3	0	0	0	0	0	0	0	0	0	0	1	3	3	2	0	0	0	0	0	0	0	0	0	0	4	2
South Broxbourne	26	83	6	20	0	0	11	36	1	4	0	0	45	143	28	17	3	2	0	0	3	2	1	1	0	0	36	22
West Broxbourne	1	2	0	0	0	0	0	0	0	0	0	0	1	2	2	1	0	0	0	0	0	0	0	0	0	0	2	2
Enfield	4	13	0	1	0	0	0	0	0	0	0	0	4	14	13	8	1	0	0	0	0	0	0	0	0	0	14	9
Welwyn Hatfield	1	2	0	0	0	0	0	0	0	0	0	0	1	2	2	1	0	0	0	0	0	0	0	0	0	0	2	1
East Herts	1	4	0	0	0	0	0	0	0	0	0	0	1	4	4	3	0	0	0	0	0	0	0	0	0	0	4	3
Harlow	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	1	1
Epping Forest	1	2	0	0	0	0	0	0	0	0	0	0	1	2	2	1	0	0	0	0	0	0	0	0	0	0	3	2
Strategic S	2	7	0	0	1	2	0	0	0	0	0	0	3	9	7	4	0	0	2	1	0	0	0	0	0	0	10	6
Strategic W	2	5	0	0	0	2	0	0	0	0	0	0	2	7	5	3	0	0	2	1	0	0	0	0	0	0	7	4
Strategic N	1	4	0	0	0	1	0	0	0	0	0	0	2	5	4	2	0	0	1	1	0	0	0	0	0	0	5	3
Strategic E	1	3	0	0	0	1	0	0	0	0	0	0	1	4	3	2	0	0	1	1	0	0	0	0	0	0	4	3
External Total	41	130	7	22	2	7	11	36	1	4	0	0	63	199	76	47	5	3	7	4	3	2	2	1	0	0	93	57
Total	41	130	7	22	2	7	11	36	1	4	0	0	63	199	76	47	5	3	7	4	3	2	2	1	0	0	93	57
	65%	65%	11%	11%	3%	3%	18%	18%	2%	2%	0%	0%	100%	100%	82%	82%	5%	5%	8%	8%	3%	3%	2%	2%	0%	0%	100%	100%
	65%		11%		3%		18%		2%		0%		100%		82%		5%		8%		3%		2%		0%		100%	

Vehicle trips – output

Car driver trip calculations

Total Car Driver Trips by Direction, Period, Zone and Purpose

Destination	AM				PM				Total			
	Work Trips		Education Trips		Work Trips		Education Trips		AM peak		PM peak	
	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound
MDA Internal	0	0	0	0	0	0	0	0	0	0	0	0
Local Zones :			0	0			0	0				
North Broxbourne	1	2	0	0	2	1	0	0	1	2	2	1
South Broxbourne	6	20	9	29	21	13	2	1	16	50	23	14
West Broxbourne	1	2	0	0	2	1	0	0	1	2	2	1
Enfield	3	11	0	0	11	7	0	0	3	11	11	7
Welwyn Hatfield	1	2	0	0	2	1	0	0	1	2	2	1
East Herts	1	3	0	0	3	2	0	0	1	3	3	2
Harlow	0	1	0	0	1	1	0	0	0	1	1	1
Epping Forest	1	2	0	0	2	1	0	0	1	2	2	1
Strategic S	2	6	0	0	6	4	0	0	2	6	6	4
Strategic W	1	4	0	0	4	3	0	0	1	4	4	3
Strategic N	1	3	0	0	3	2	0	0	1	3	3	2
Strategic E	1	3	0	0	3	2	0	0	1	3	3	2
Total	19	59	9	29	61	37	2	1	28	88	62	38

Appendix 6 – Site details for each scenario

SCENARIO 2 – CORE STRATEGY

NB The data for scenario 2 is based on a list of sites prepared by BBC at the beginning of 2010 with this modelling work being based on the March 2010 Strategic Housing Land Availability Assessment report. It should be noted that this report has now been amended and will continue to be amended with sites being removed or completed and new sites added.

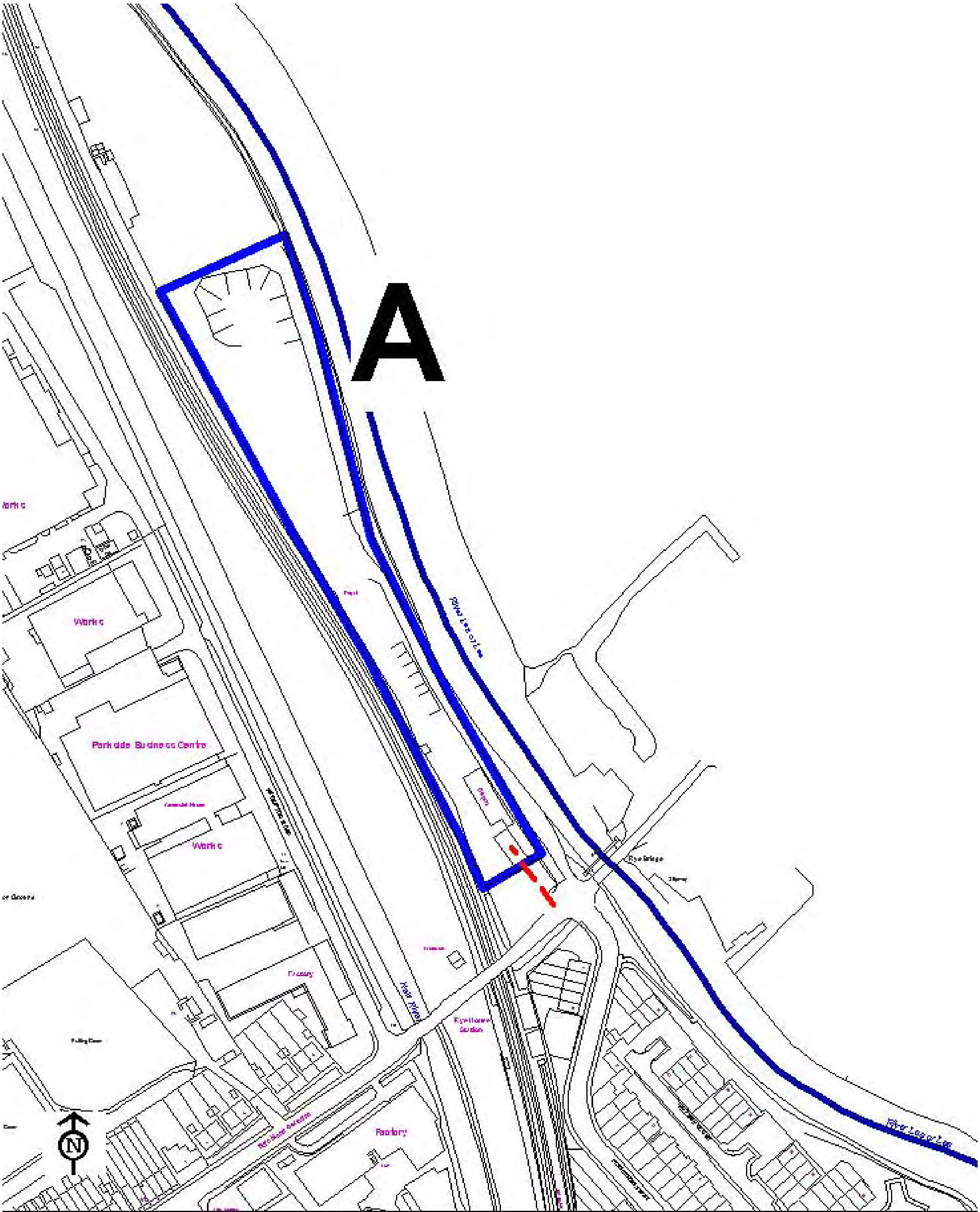
Site	Area	Number of units/ total floorspace & total jobs	Period of Development	Site Status	Access to (refer to maps)
A – Turnford Surfacing site	Hoddesdon	70 units	2016-2021	SHLAA	Rye Road
B – Land south of Essex Road	Hoddesdon	120 units	2016-2021	SHLAA	Dinant Link Road roundabout or Lampits
C – 19 Amwell Street, Scania House	Hoddesdon	52 units	2016-2021	SHLAA	Amwell Street
D – Tower Centre	Hoddesdon	75 units	2021-2026	SHLAA	Amwell Street/ Burford Street
E – Herts Regional College	Broxbourne/ Wormley/ Turnford	212 units	2009-2016	Commitment	The Springs
F – Turnford Triangle	Broxbourne/ Wormley/ Turnford	80 units	2009-2016	Commitment	High Road Turnford
G – Cheshunt South Reservoir	Cheshunt	249 units	2009-2016	Commitment	Brookfield Lane
H – Old St Mary's School site	Cheshunt	75 units	2009-2016	Commitment	Access road to Churchgate
I – Land at Cheshunt School	Cheshunt	60 units	2009-2016	SHLAA	College Road
J – Allotments off Russell's Ride	Cheshunt	58 units	2016-2021	SHLAA	Russell's Ride
K – Colemans Warehouse	Cheshunt	71 units	2021-2026	SHLAA	From above development or Burbage Close
L – Land off Hammondstreet Road	Cheshunt	70 units	2016-2021	SHLAA	Great Stockwood Road or Biggs Grove Road
M – 224-258 High Street Waltham Cross	Waltham Cross	70 units	2016-2021	SHLAA	High Street Waltham Cross
N – Land off Sturlas Way	Waltham Cross	56 units	2016-2021	SHLAA	Sturlas Way
O – Sorting office	Waltham Cross	50 units	2021-2026	SHLAA	Eleanor Cross Road or Abbey Road
P – Car showrooms. Waltham Cross	Waltham Cross	64 units	2021-2026	SHLAA	Eleanor Cross Road
Q - Land bounded by Station Road, Lea Road and Gordon Road Waltham Cross	Waltham Cross	149 units	2021-2026	SHLAA	Station Road
R – Hazlemere Marina	Waltham Cross	128 units	2016-2021	SHLAA	Station Road

Park Plaza North	Waltham Cross	33,000 sq m floorspace	2009-2021	Allocation	Existing junction arrangement – Brief also examines additional roundabout arm and slip way from Winston Churchill Way
Greater Brookfield	Cheshunt/ Turnford	500 units	2016-2021	Strategic Site	New link road from Turnford roundabout to development. Also access from A10 slip road and Brookfield Lane at present (both to remain)

OTHER DEVELOPMENT SCENARIOS

Part of S3 Bury Green	Cheshunt	200 units	Post 2021/2026	Area of Search	Existing roundabout arrangement (to access new school site)
Part of S4/S5 Hertford Road	Hoddesdon	260 units	Post 2021/2026	Area of Search	Hertford Road
Part of S4/S5 West of Hoddesdon	Hoddesdon	850 units (developer estimate – 650 – 1000 units)	Post 2021/2026	Area of Search	A10 or existing streets (Lord Street to the south and Hertford Road to the north)
Part of S7 / Part of S3 Southern A10 Corridor (Maxwells/ Albury)	Cheshunt	Albury Farm East – 100 units Maxwells Farm West – 100,000 sq m B2 and B8 floorspace	Post 2021/2026	Area of Search	Either from the A10 for both sites or by using Albury Ride for the site at Albury Farm East
S8 Park Plaza West	Waltham Cross	100,000 sq m B1 floorspace	Post 2021/2026	Area of Search	Existing junction arrangement (alternative access possible from Lieutenant Ellis Way
S6 Goff’s Oak	Goff’s Oak	850 units	Post 2021/2026	Area of Search	Traffic movement expected on smaller roads travelling down Goff’s Lane and to the south of the Borough and travelling east from the northern part of the site

Appendix 7 – Site locations and access points



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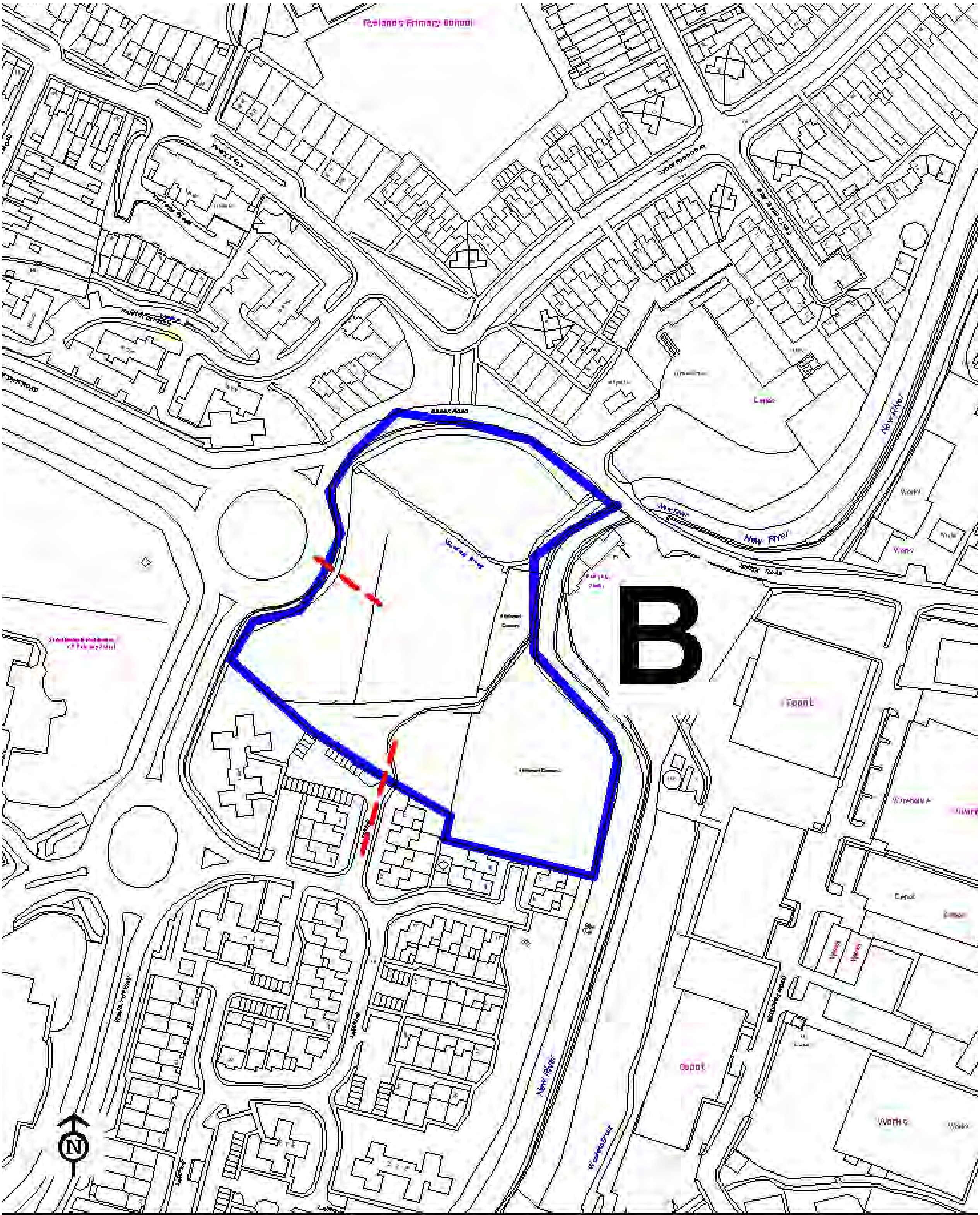

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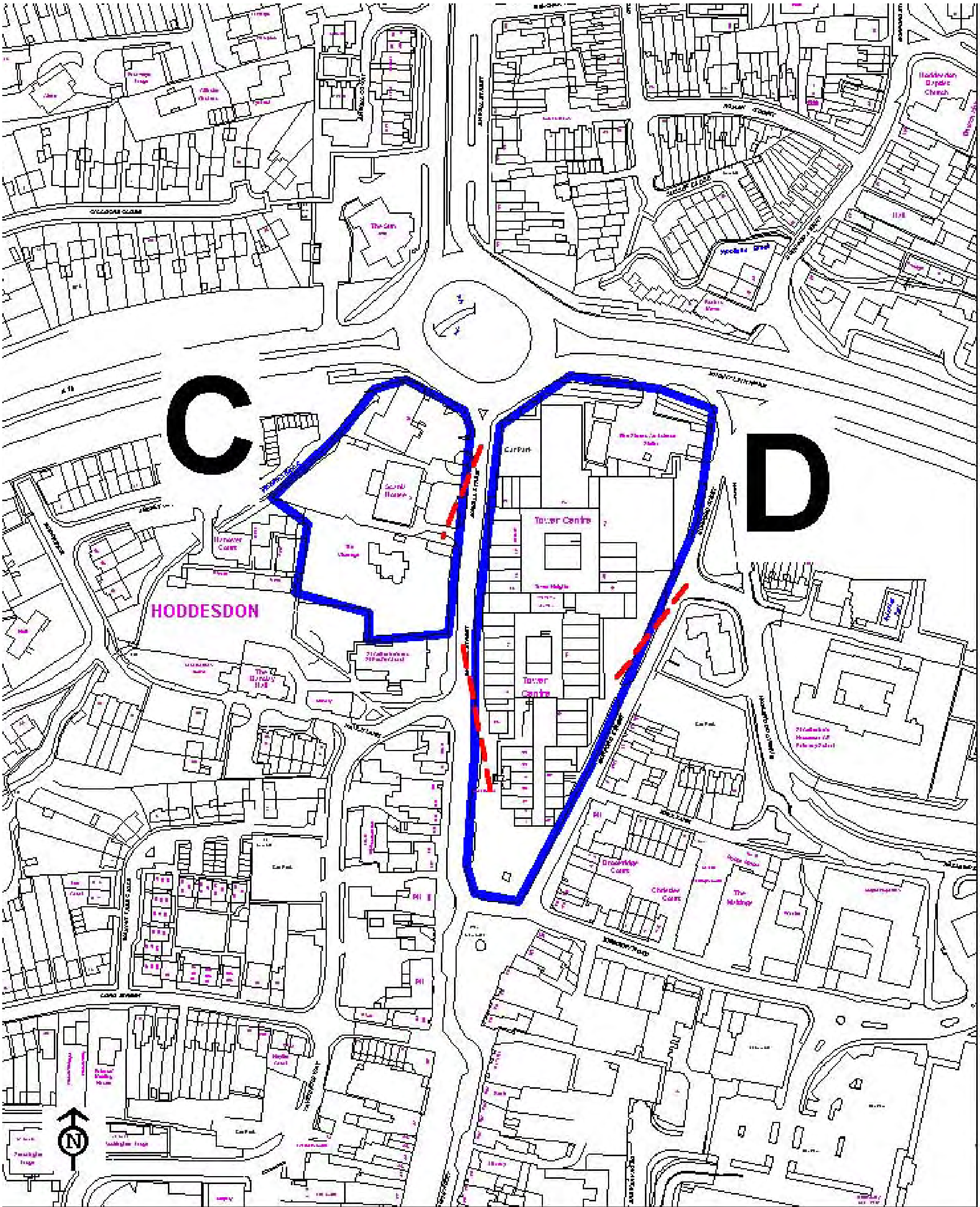

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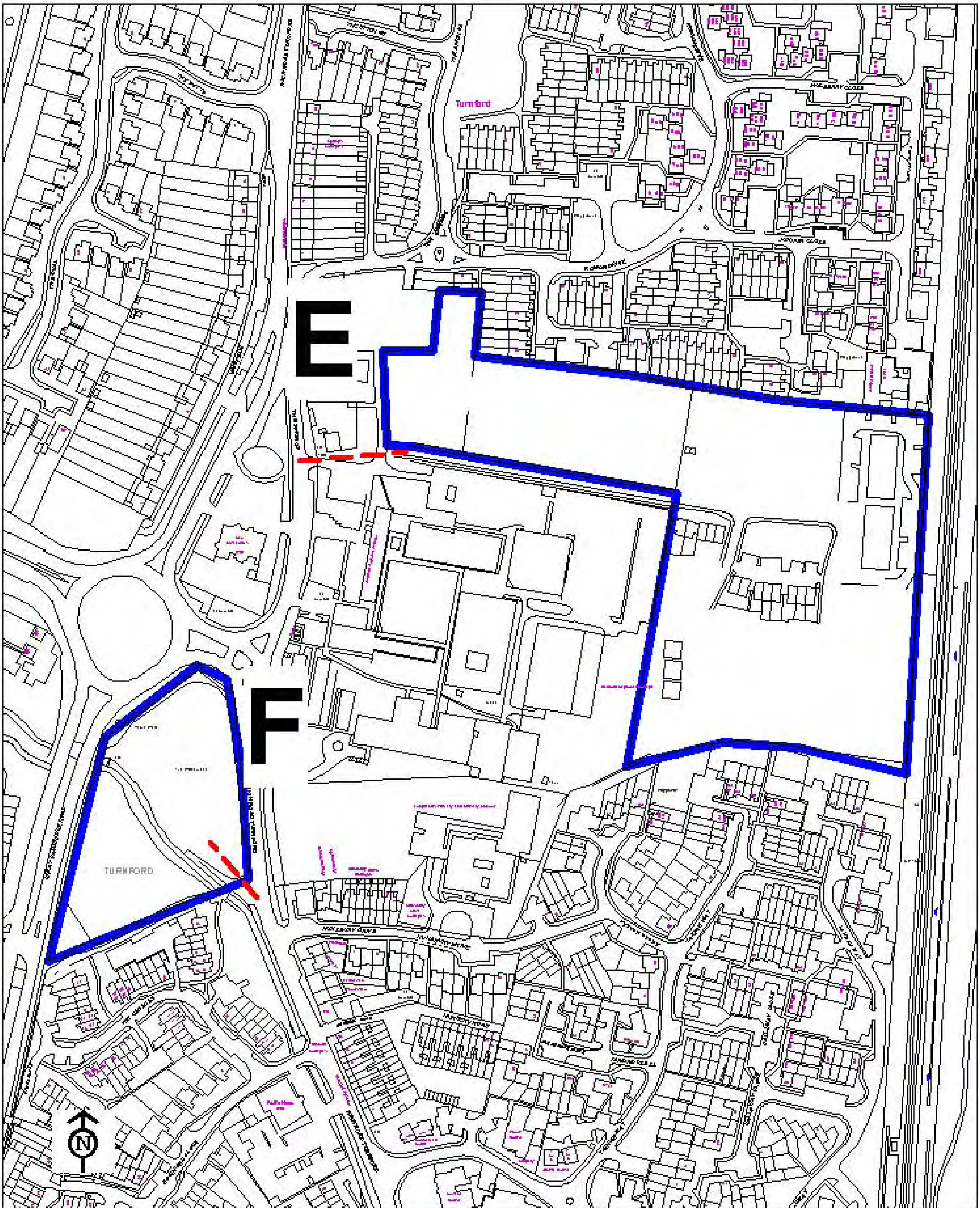

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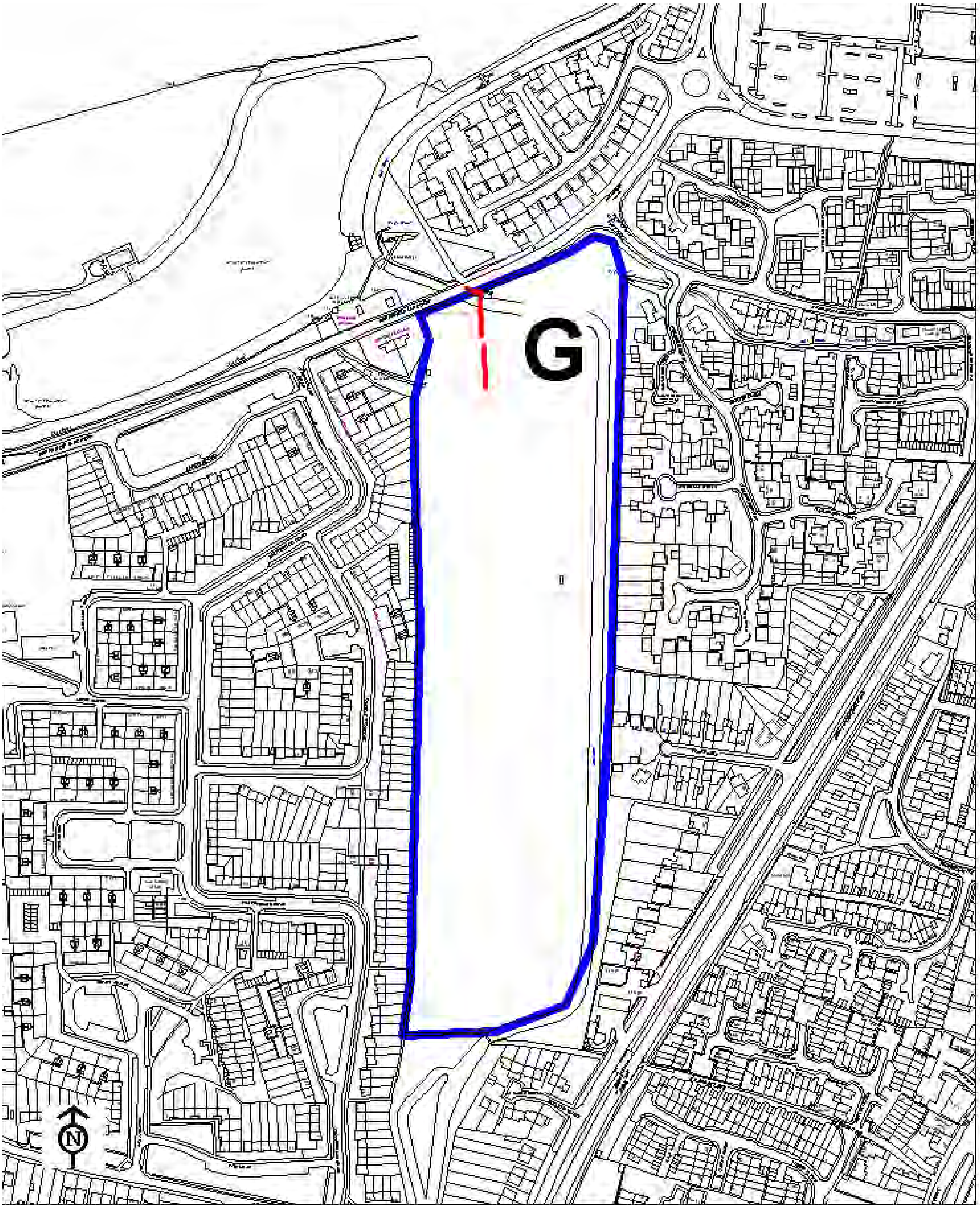

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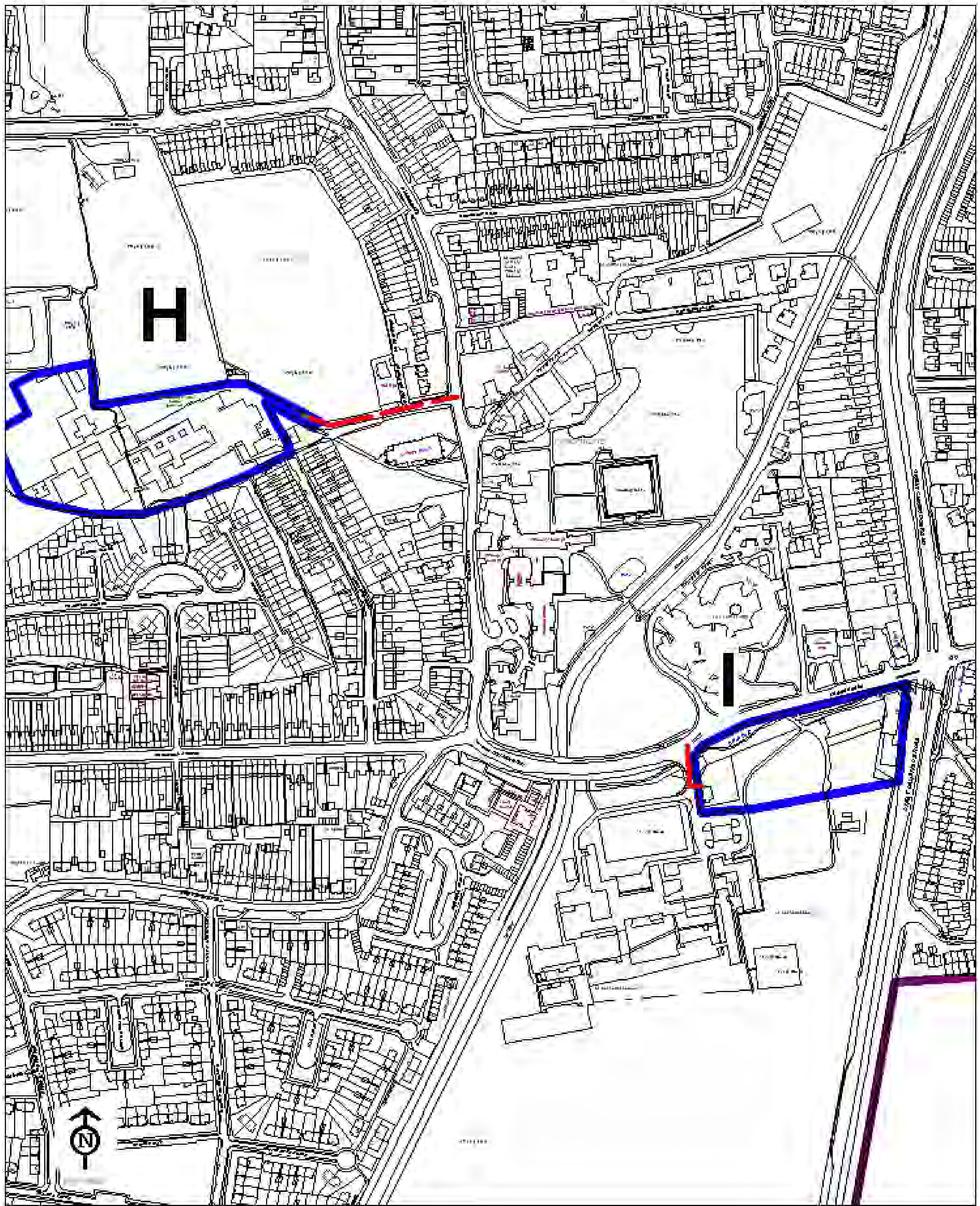

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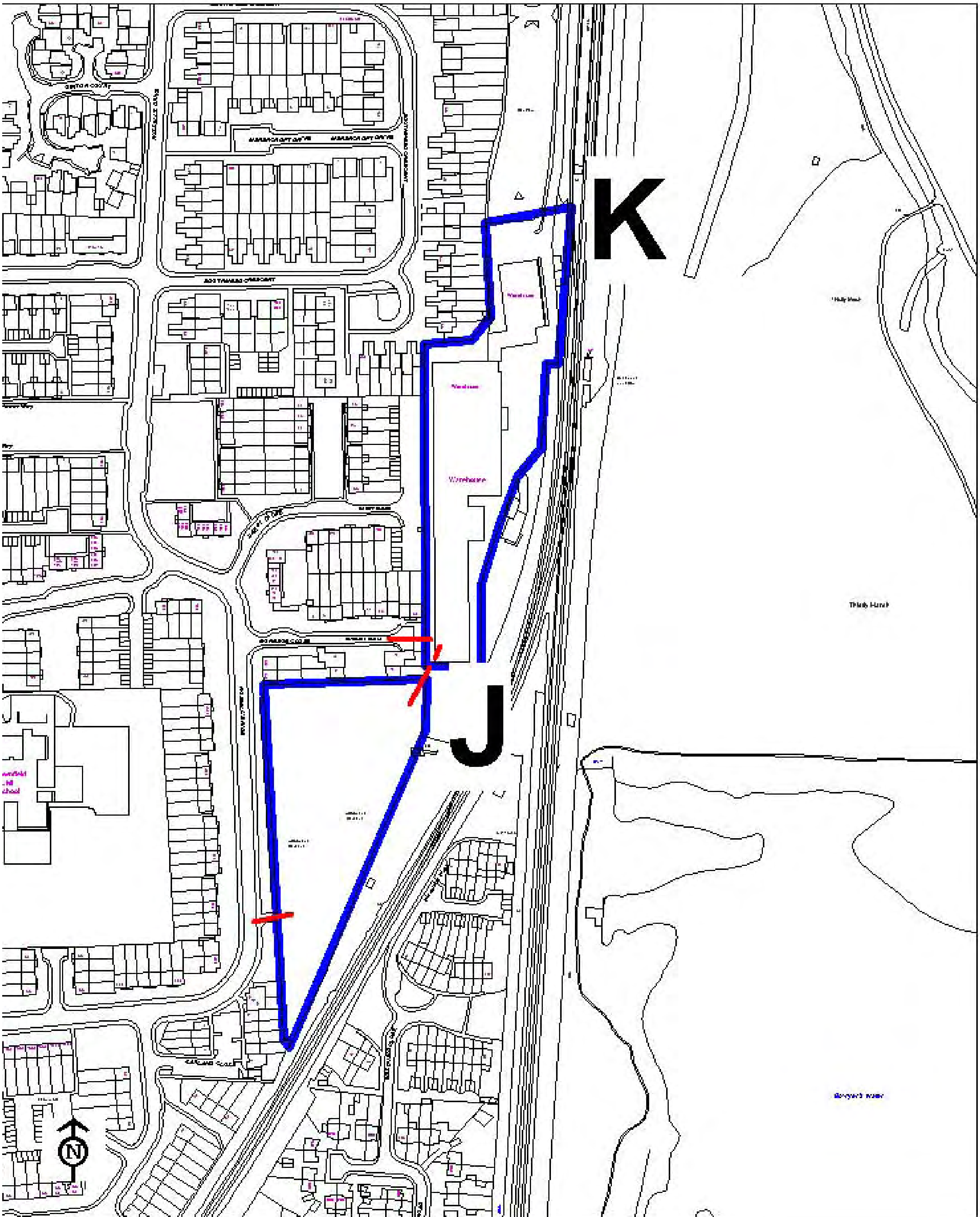

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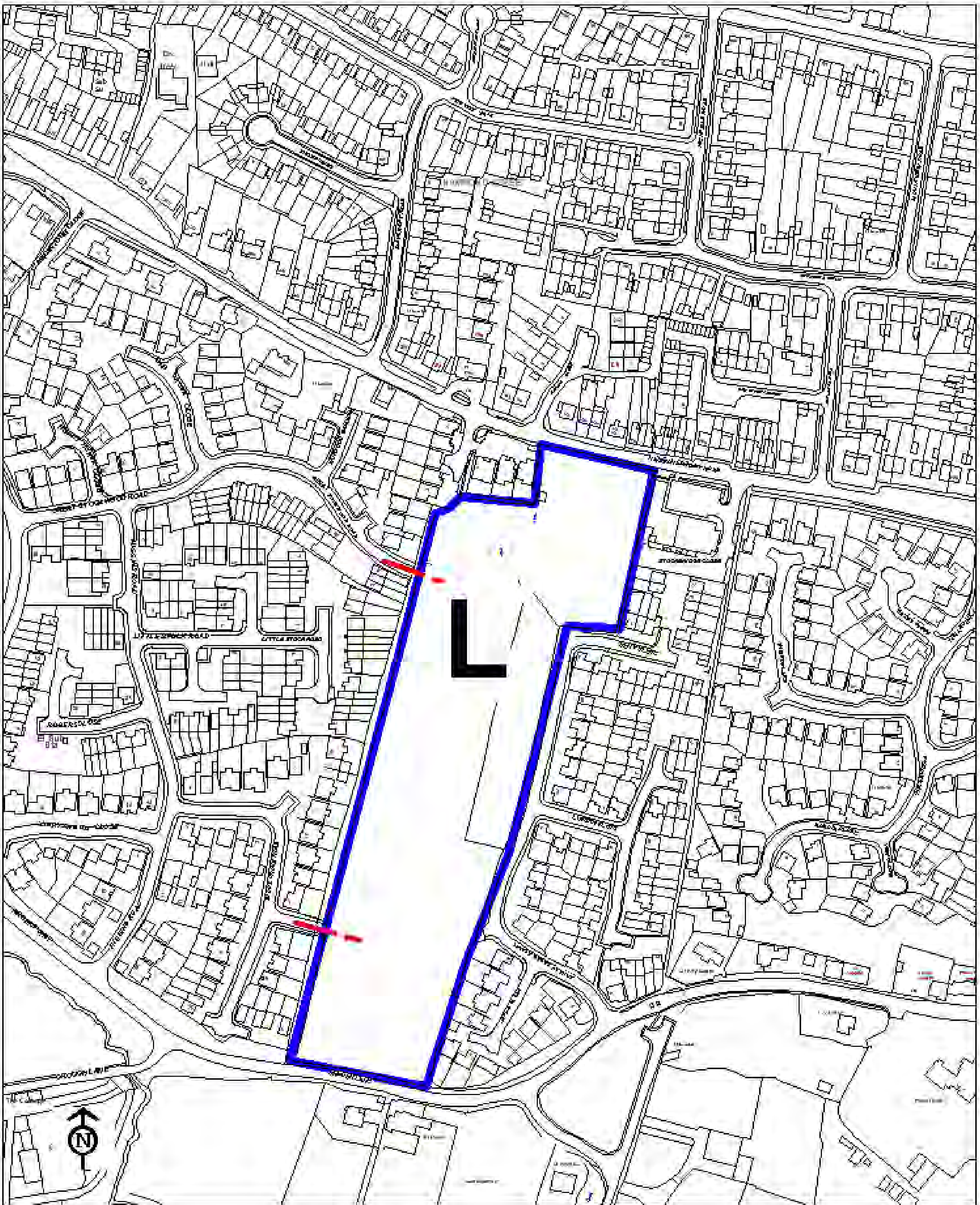

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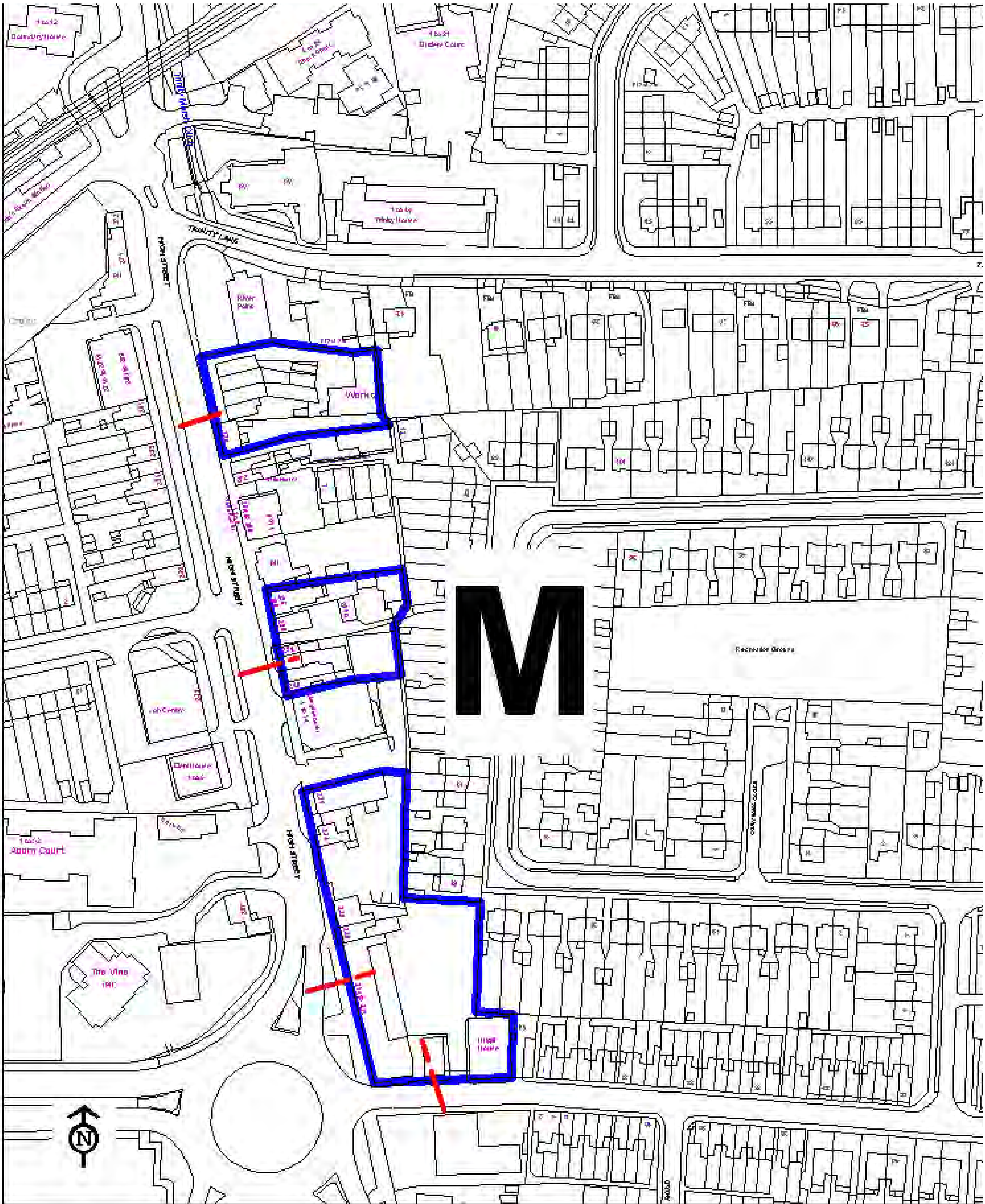

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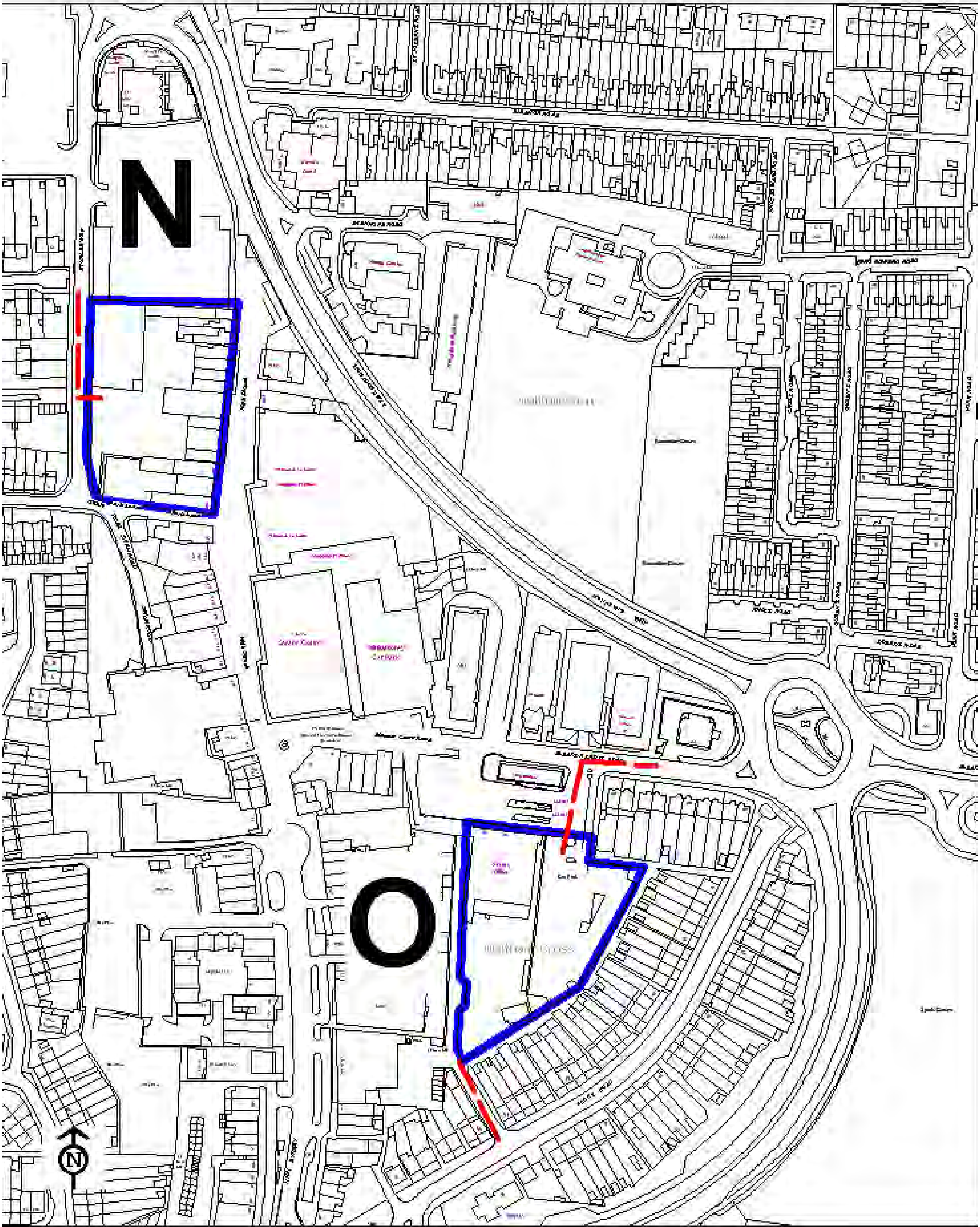

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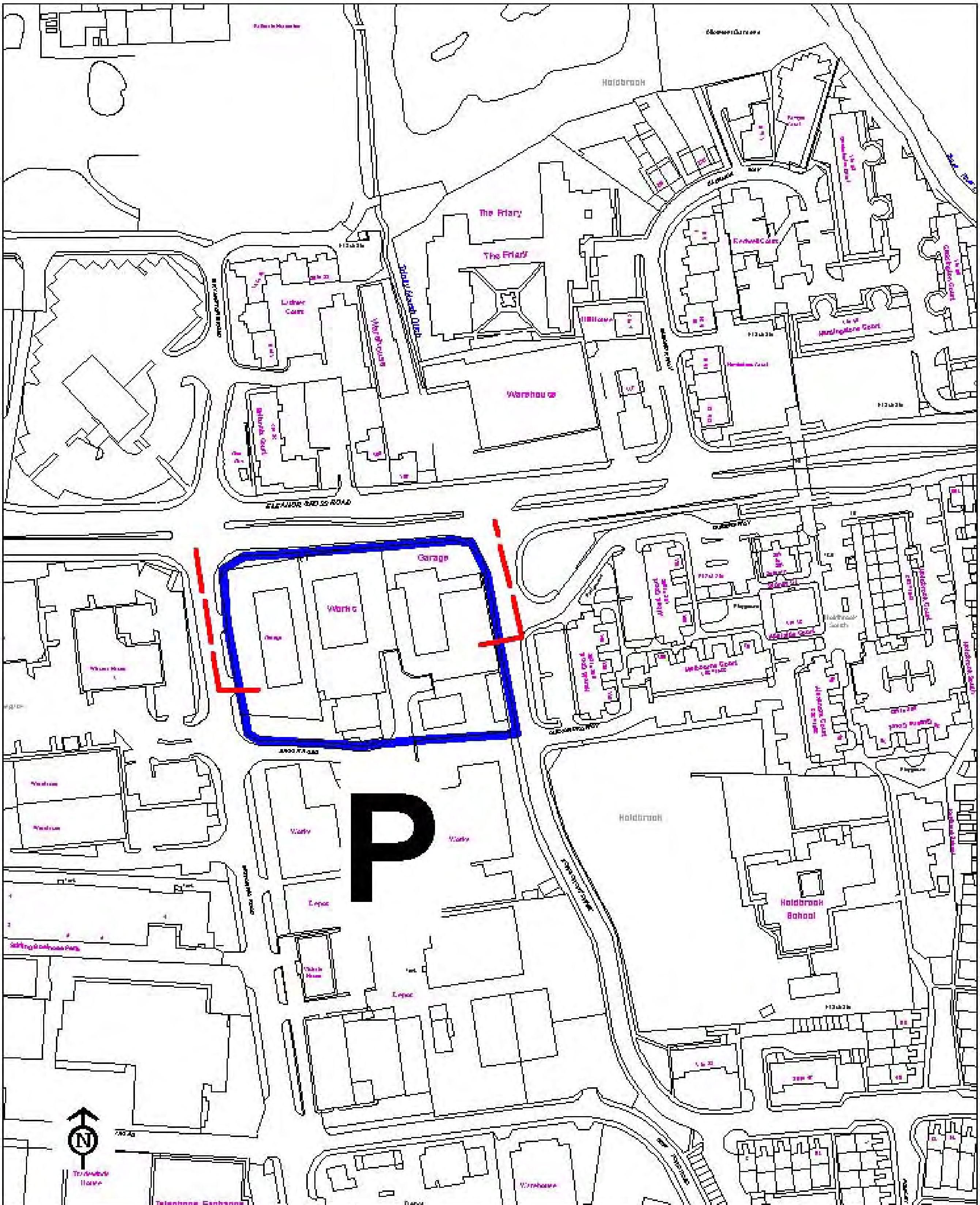

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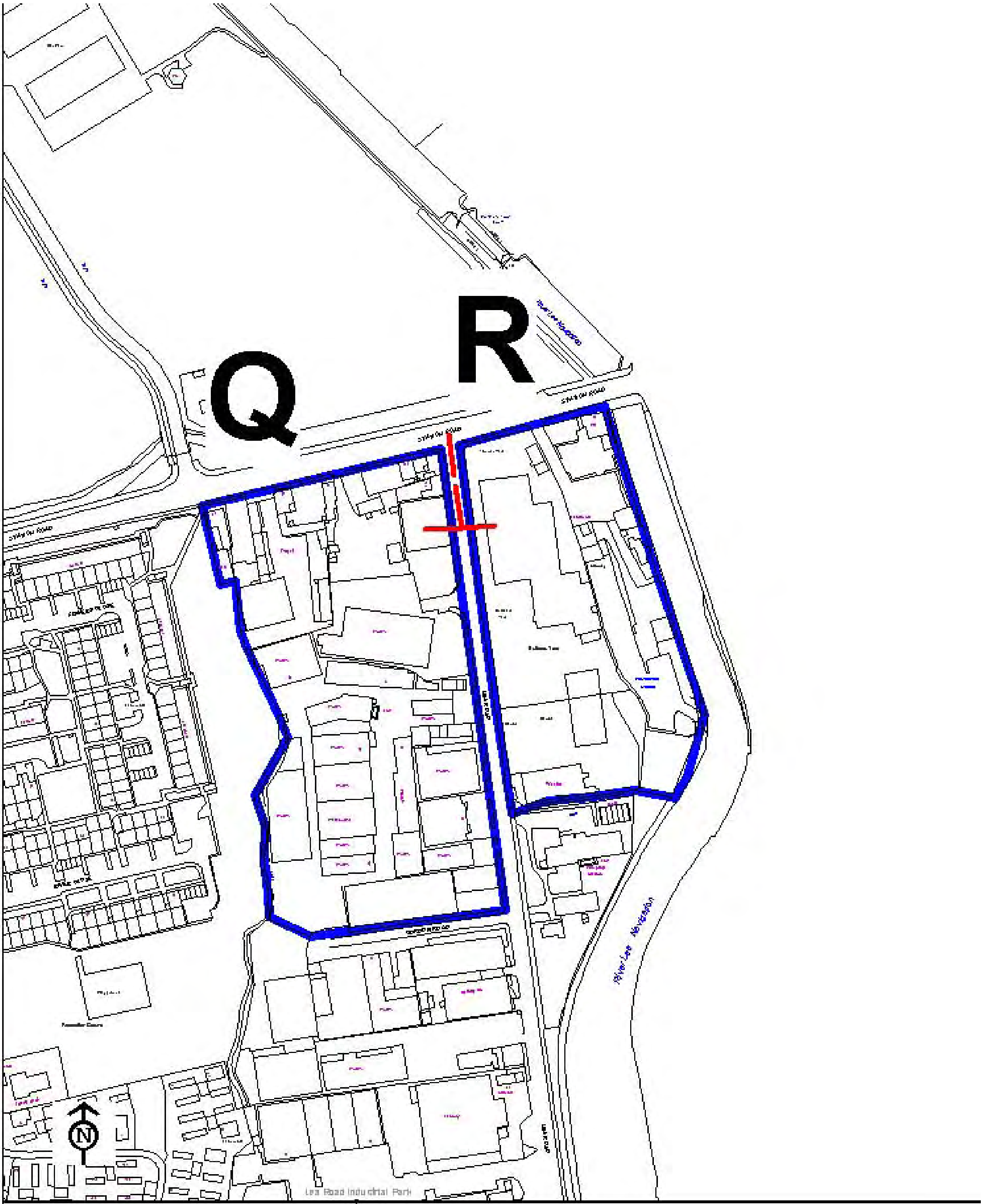

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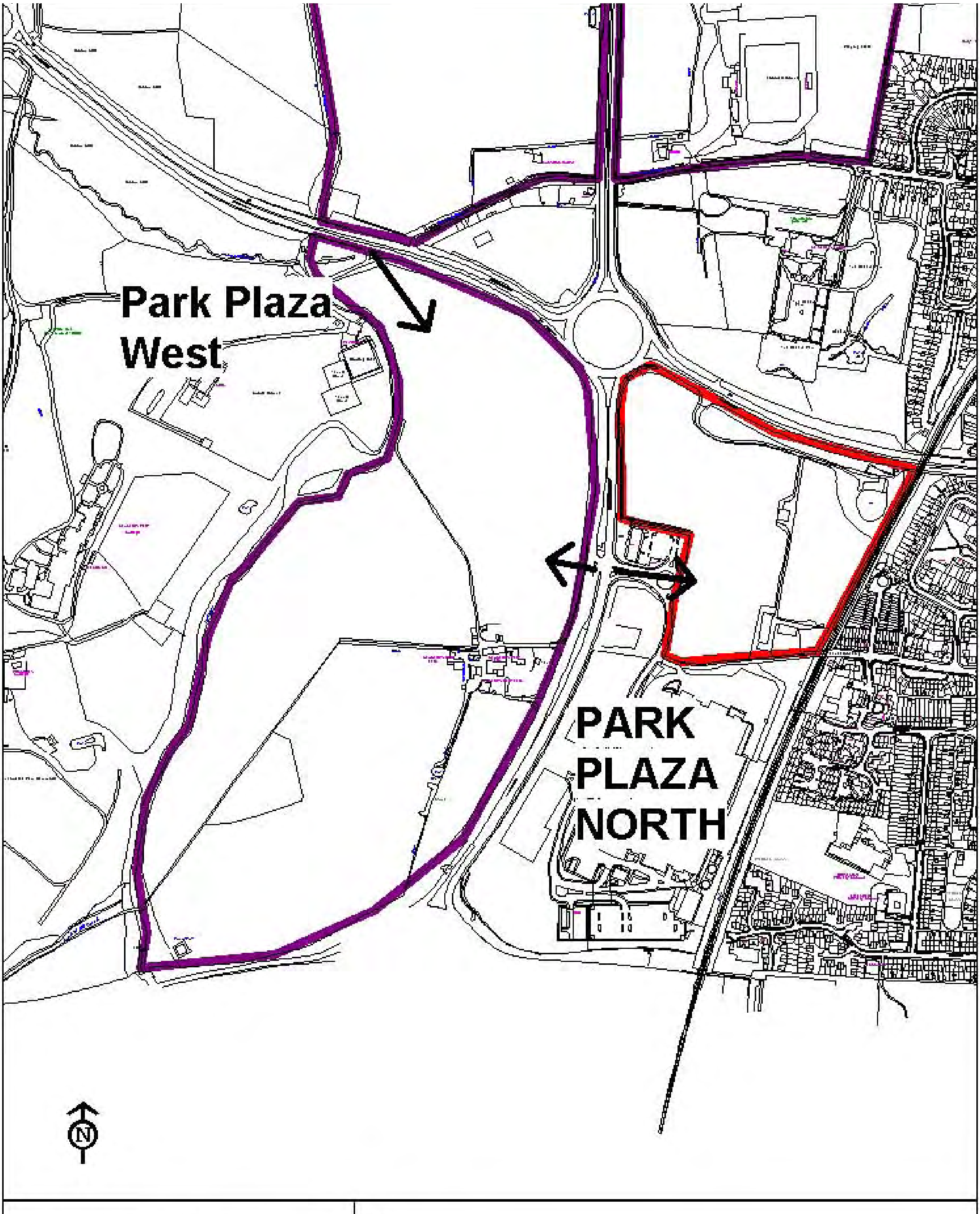

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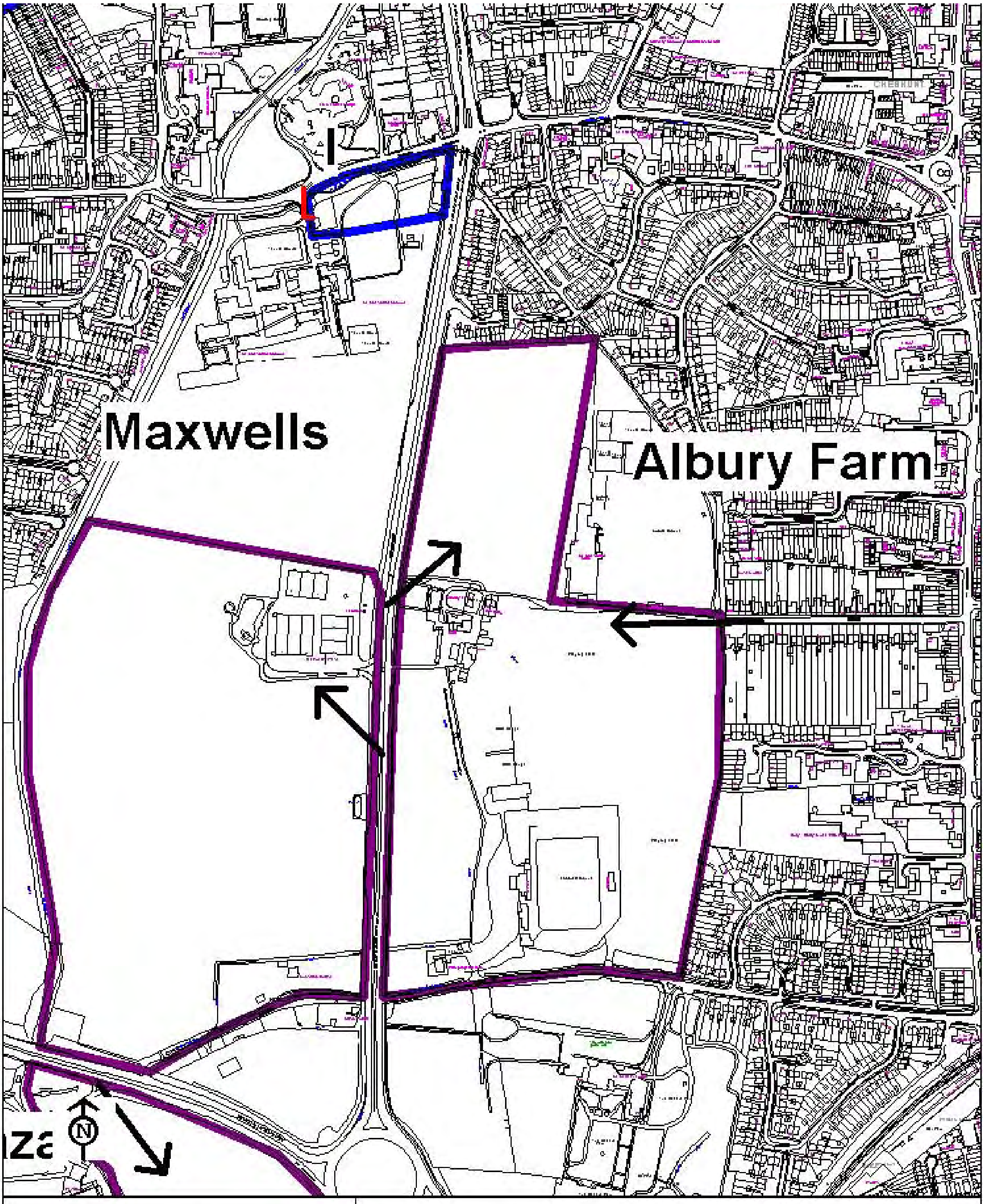

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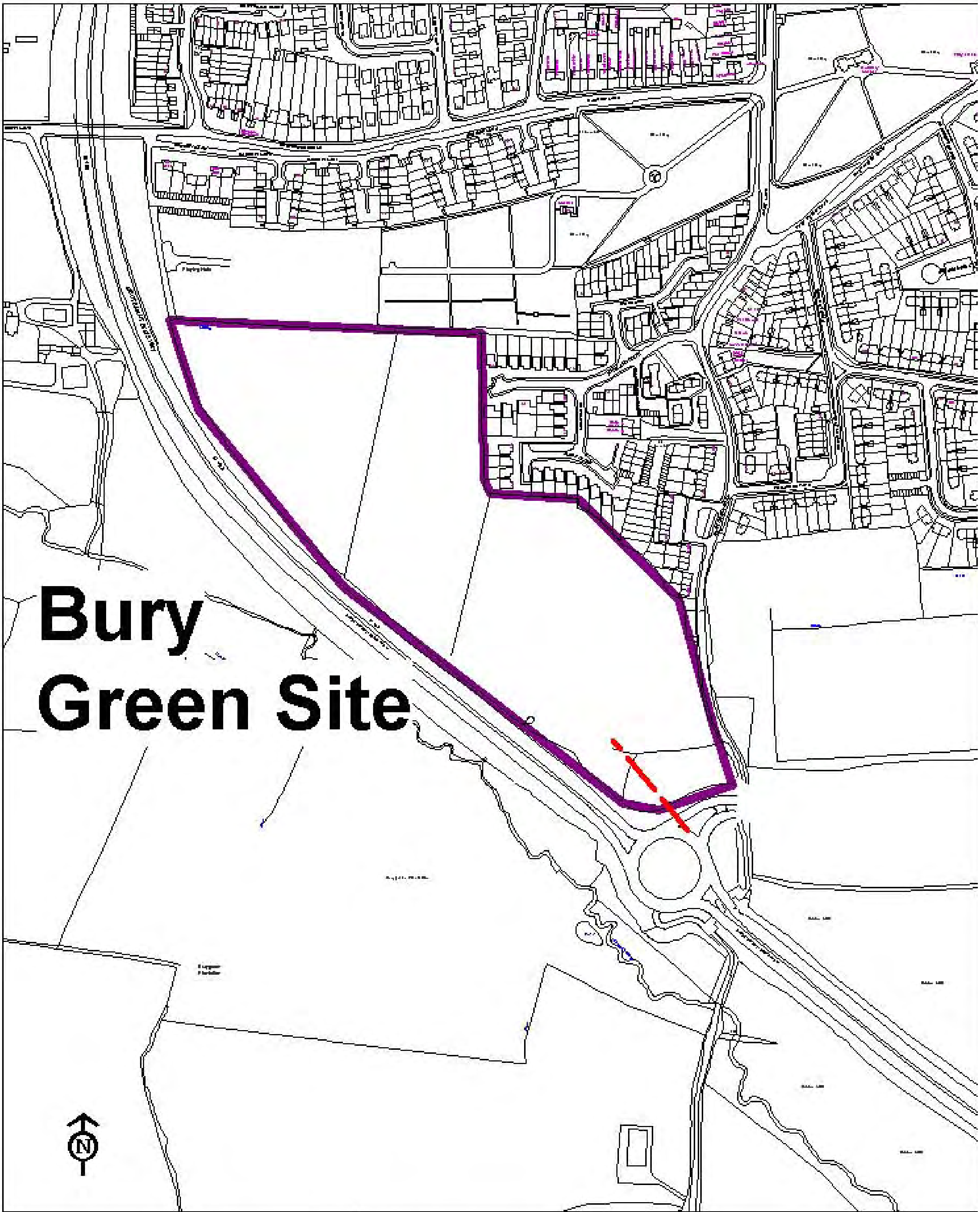

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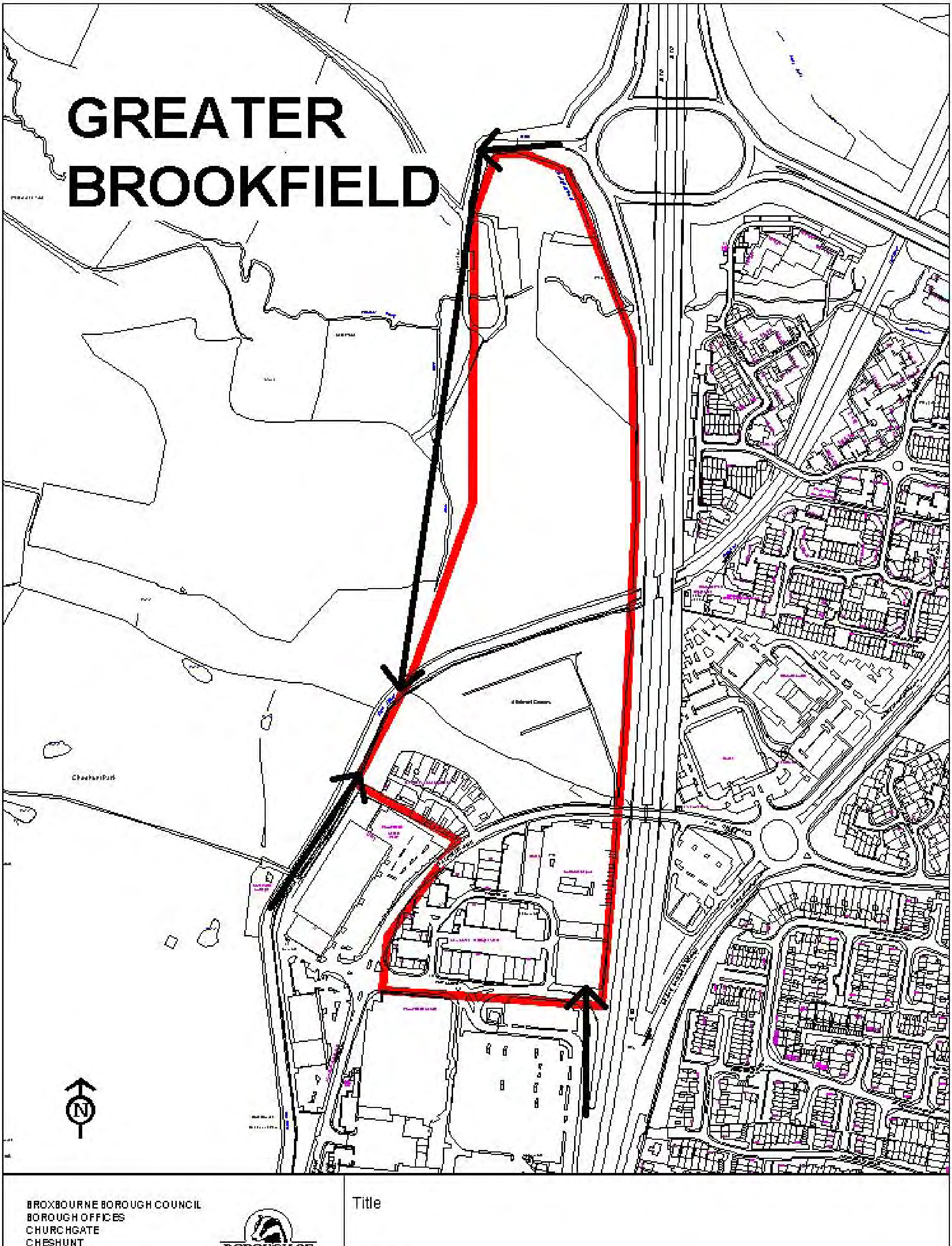

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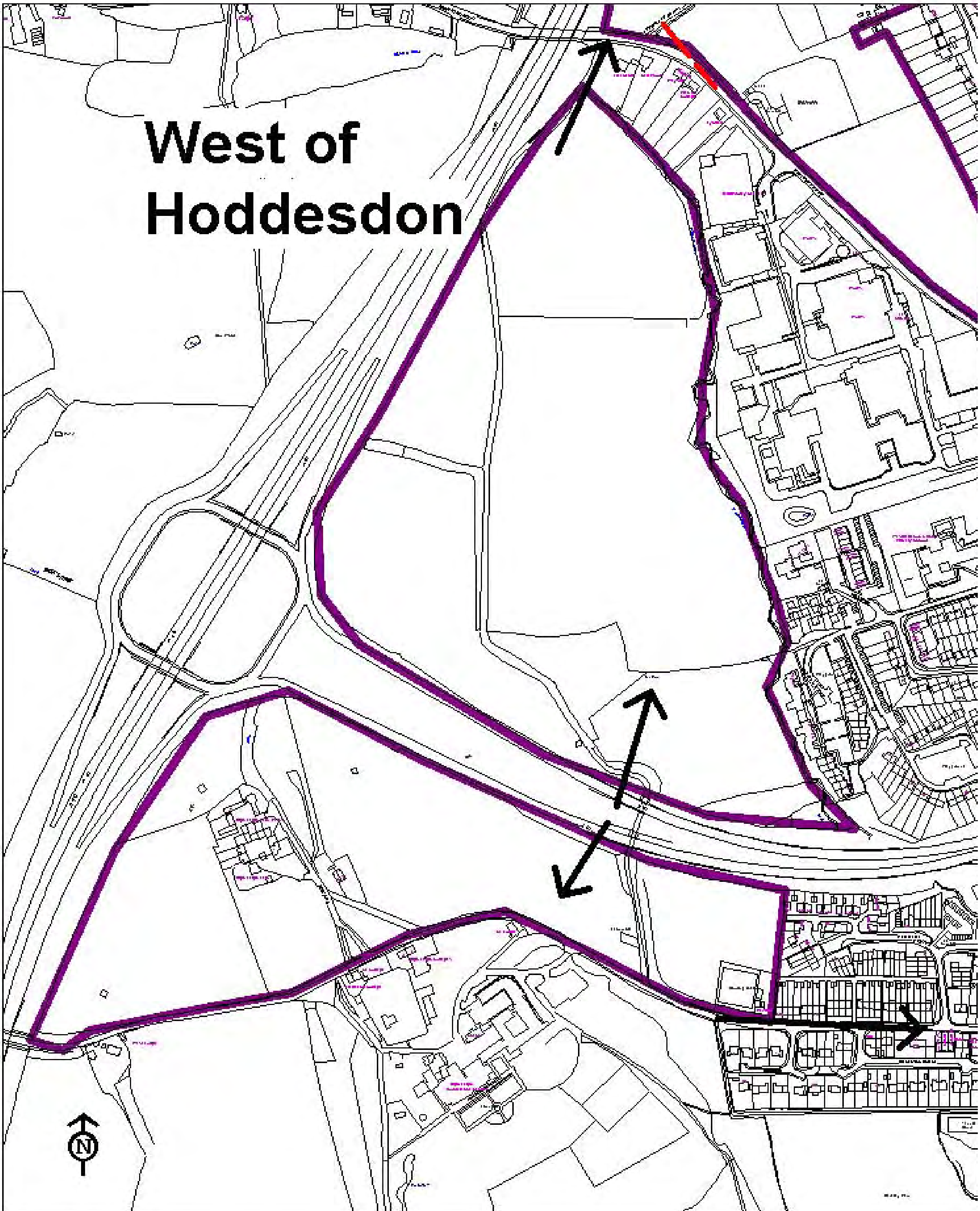

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Title

Location

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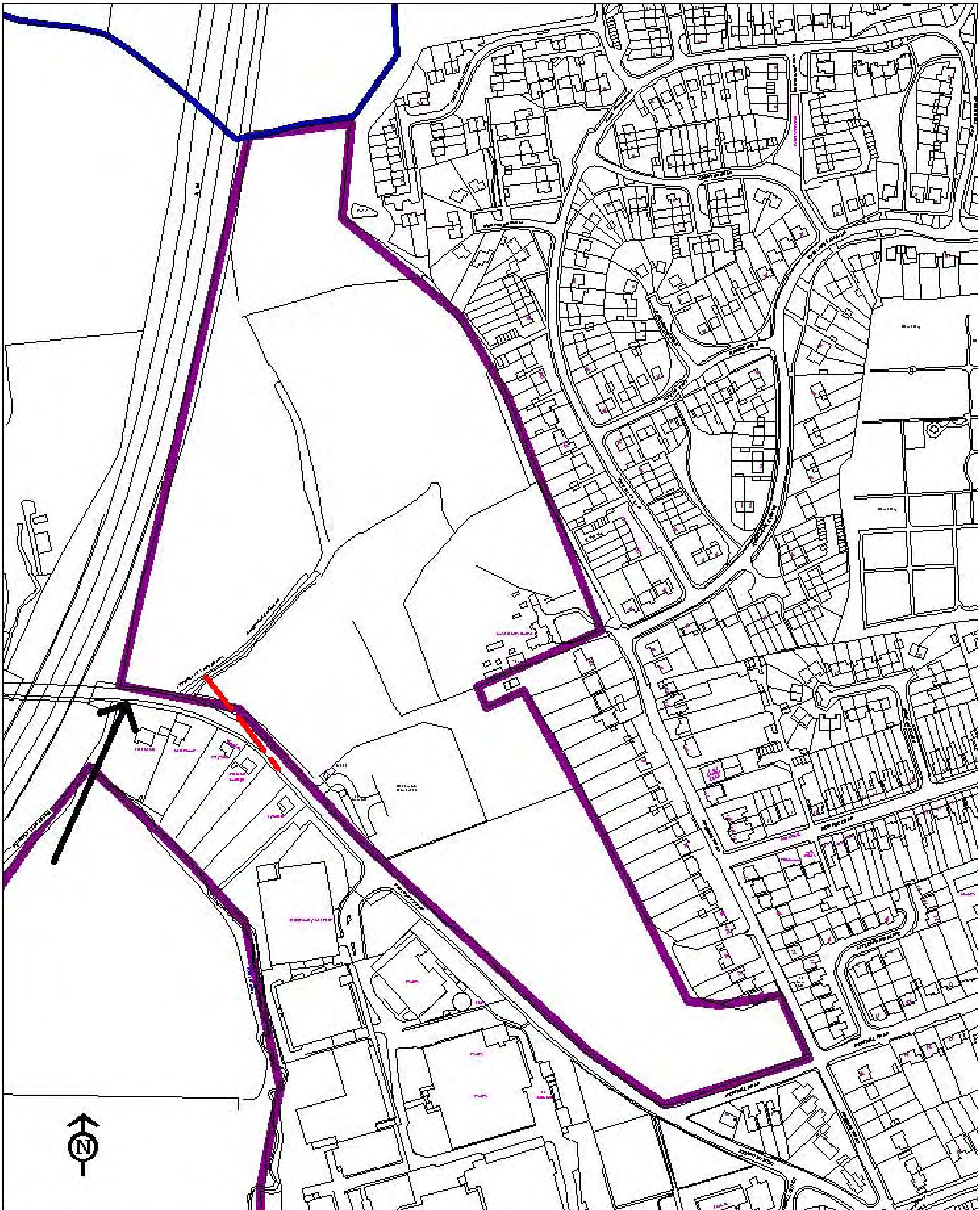
Centre: 536313.53 , 209184.42
User



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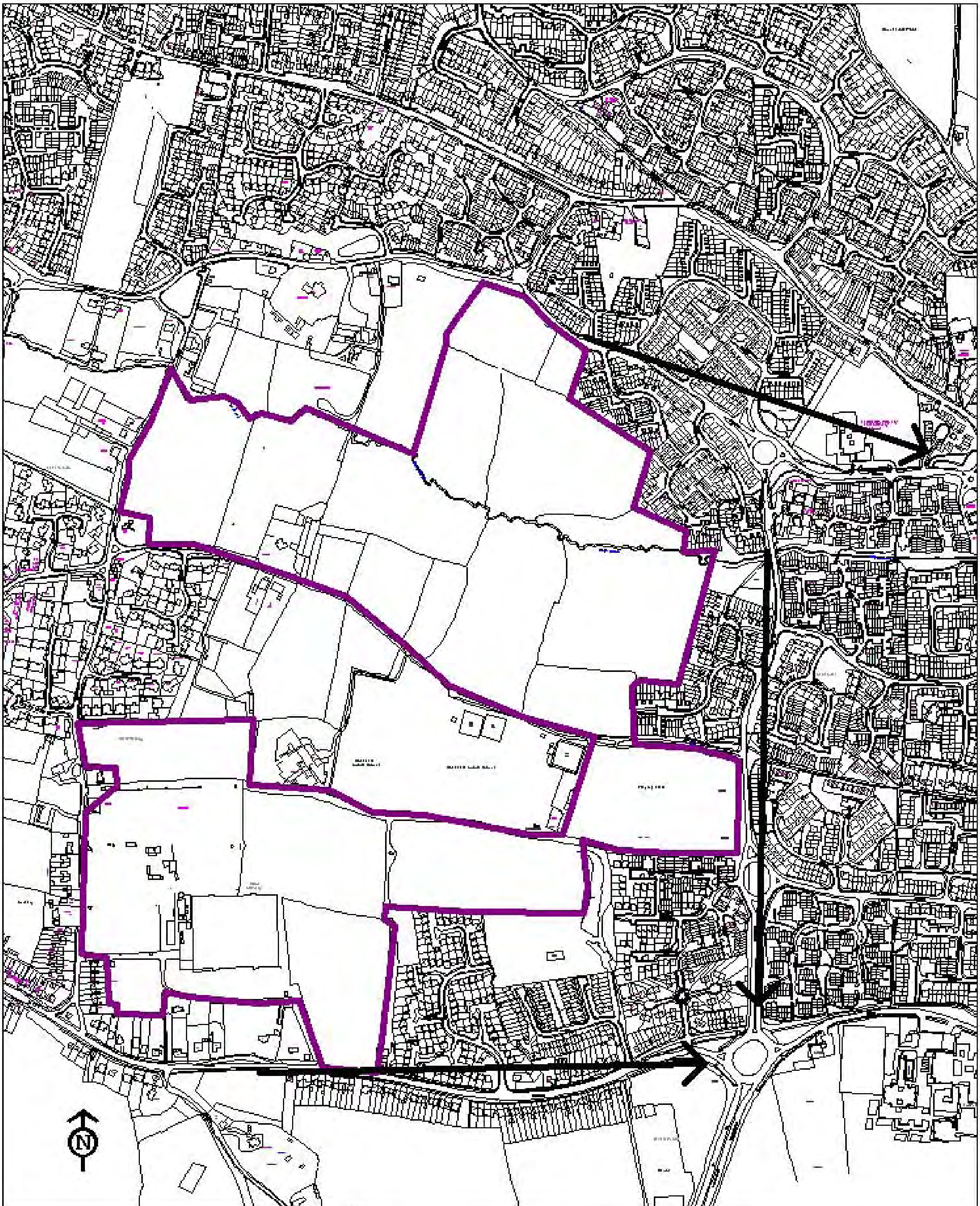
Centre: 536688.08 , 209821.89
User



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Centre: 533669.30 , 203328.19

User:

Appendix 8 – Composite model output - links

			AM									PM								
TAM link	A_B	Link Description	P1	P2	P3	P4	P5	P2	P3	P4	P5	P1	P2	P3	P4	P5	P2	P3	P4	P5
1	21092_90663	A10 Northbound North of A414	80%	82%	83%	83%	84%	Base >80%	Base >80%	Base >80%	Base >80%	45%	47%	48%	48%	51%	<80%	<80%	<80%	<80%
2	90663_83227	A10 Southbound North of A414	42%	44%	44%	44%	48%	<80%	<80%	<80%	<80%	84%	87%	88%	88%	89%	Base >80%	Base >80%	Base >80%	Base >80%
3	83220_83223	A414 Eastbound A10 to A1170	45%	45%	46%	46%	46%	<80%	<80%	<80%	<80%	52%	52%	53%	53%	53%	<80%	<80%	<80%	<80%
4	83222_83221	A414 Westbound A10 to A1170	49%	50%	50%	50%	51%	<80%	<80%	<80%	<80%	47%	48%	49%	49%	49%	<80%	<80%	<80%	<80%
5	83224_83293	A414 Eastbound East of A1170	34%	34%	34%	34%	35%	<80%	<80%	<80%	<80%	87%	88%	88%	88%	89%	Base >80%	Base >80%	Base >80%	Base >80%
6	83292_83225	A414 Westbound East of A1170	83%	84%	84%	84%	84%	Base >80%	Base >80%	Base >80%	Base >80%	36%	36%	36%	36%	36%	<80%	<80%	<80%	<80%
7	90635_90687	A10 Northbound B1197 to A414	71%	73%	73%	74%	74%	<80%	<80%	<80%	<80%	65%	68%	68%	68%	72%	<80%	<80%	<80%	<80%
8	90687_90635	A10 Southbound B1197 to A414	62%	63%	64%	64%	67%	<80%	<80%	<80%	<80%	74%	77%	78%	78%	79%	<80%	<80%	<80%	<80%
9	94258_83222	A1170 Northbound B1197 to A414	32%	32%	34%	32%	34%	<80%	<80%	<80%	<80%	13%	13%	14%	14%	14%	<80%	<80%	<80%	<80%
10	83225_94258	A1170 Southbound B1197 to A414	12%	12%	12%	12%	12%	<80%	<80%	<80%	<80%	35%	35%	37%	37%	37%	<80%	<80%	<80%	<80%
11	96487_97404	B1197 Eastbound West of A10	37%	39%	40%	40%	44%	<80%	<80%	<80%	<80%	27%	31%	33%	33%	34%	<80%	<80%	<80%	<80%
12	97404_96487	B1197 Westbound West of A10	24%	26%	28%	28%	29%	<80%	<80%	<80%	<80%	42%	46%	48%	48%	52%	<80%	<80%	<80%	<80%
13	97404_94258	B1197 Eastbound A10 to A1170	55%	58%	81%	59%	87%	<80%	Worse >80%	<80%	Worse >80%	30%	34%	42%	39%	44%	<80%	<80%	<80%	<80%
14	94258_97404	B1197 Westbound A10 to A1170	27%	29%	35%	31%	37%	<80%	<80%	<80%	<80%	61%	68%	84%	76%	91%	<80%	Worse >80%	<80%	Worse >80%
15	21090_90635	A10 Northbound A1170 to B1197	71%	73%	73%	74%	74%	<80%	<80%	<80%	<80%	65%	68%	68%	68%	72%	<80%	<80%	<80%	<80%
16	90635_83215	A10 Southbound A1170 to B1197	62%	63%	64%	64%	67%	<80%	<80%	<80%	<80%	74%	77%	78%	78%	79%	<80%	<80%	<80%	<80%
17	94261_94258	A1170 Northbound A1170 to B1197	44%	45%	48%	46%	49%	<80%	<80%	<80%	<80%	36%	38%	43%	41%	45%	<80%	<80%	<80%	<80%
18	94258_94261	A1170 Southbound A1170 to B1197	33%	35%	41%	35%	43%	<80%	<80%	<80%	<80%	48%	50%	53%	52%	54%	<80%	<80%	<80%	<80%
19	n/a	Lord St Eastbound	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
20	n/a	Lord St Westbound	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
21	83212_94261	A1170 Eastbound A10 to Site 5	37%	45%	52%	52%	54%	<80%	<80%	<80%	<80%	24%	32%	36%	36%	41%	<80%	<80%	<80%	<80%
22	94261_83213	A1170 Westbound A10 to Site 5	22%	28%	31%	29%	36%	<80%	<80%	<80%	<80%	40%	52%	57%	57%	59%	<80%	<80%	<80%	<80%
23	83212_94261	A1170 Eastbound Site 5 to A1170	37%	45%	52%	52%	54%	<80%	<80%	<80%	<80%	24%	32%	36%	36%	41%	<80%	<80%	<80%	<80%
24	94261_83213	A1170 Westbound Site 5 to A1170	22%	28%	31%	29%	36%	<80%	<80%	<80%	<80%	40%	52%	57%	58%	59%	<80%	<80%	<80%	<80%
25	96718_94262	A1170 Eastbound A1170 to A1170	27%	31%	31%	31%	31%	<80%	<80%	<80%	<80%	48%	55%	55%	55%	56%	<80%	<80%	<80%	<80%
26	96718_94261	A1170 Westbound A1170 to A1170	45%	50%	50%	50%	51%	<80%	<80%	<80%	<80%	29%	35%	35%	35%	36%	<80%	<80%	<80%	<80%
27	90673_90688	A10 Northbound A1170 to A1170	74%	80%	86%	86%	88%	Worse >80%	Worse >80%	Worse >80%	Worse >80%	63%	72%	76%	76%	84%	<80%	<80%	<80%	Worse >80%
28	90688_90673	A10 Southbound A1170 to A1170	60%	66%	69%	67%	77%	<80%	<80%	<80%	<80%	78%	87%	91%	91%	94%	Worse >80%	Worse >80%	Worse >80%	Worse >80%
29	96719_94262	A1170 Northbound Upper Marsh Lane to A1170	43%	43%	44%	44%	44%	<80%	<80%	<80%	<80%	35%	36%	36%	36%	36%	<80%	<80%	<80%	<80%
30	94262_96719	A1170 Southbound Upper Marsh Lane to A1170	33%	33%	34%	33%	34%	<80%	<80%	<80%	<80%	46%	47%	47%	47%	47%	<80%	<80%	<80%	<80%
31	96720_94262	Essex Road Eastbound East of A1170	76%	76%	76%	76%	78%	<80%	<80%	<80%	<80%	51%	52%	52%	52%	52%	<80%	<80%	<80%	<80%
32	94262_96720	Essex Road Westbound East of A1170	45%	46%	46%	46%	46%	<80%	<80%	<80%	<80%	85%	86%	86%	86%	88%	Base >80%	Base >80%	Base >80%	Base >80%
33	94294_96719	A1170 Northbound B194 to Upper Marsh Lane	66%	67%	68%	68%	68%	<80%	<80%	<80%	<80%	79%	81%	82%	82%	82%	Worse >80%	Worse >80%	Worse >80%	Worse >80%
34	96719_94294	A1170 Southbound B194 to Upper Marsh Lane	74%	75%	75%	75%	75%	<80%	<80%	<80%	<80%	71%	72%	73%	73%	73%	<80%	<80%	<80%	<80%
35	94294_97277	B194 Eastbound East of A1170	60%	60%	60%	60%	61%	<80%	<80%	<80%	<80%	80%	81%	82%	82%	83%	Base >80%	Base >80%	Base >80%	Base >80%
36	97277_94294	B194 Westbound East of A1170	72%	72%	72%	72%	74%	<80%	<80%	<80%	<80%	67%	68%	68%	68%	68%	<80%	<80%	<80%	<80%
37	83201_94294	A1170 Northbound Church Lane to B194	14%	15%	16%	16%	17%	<80%	<80%	<80%	<80%	14%	16%	17%	17%	18%	<80%	<80%	<80%	<80%
38	94294_83201	A1170 Southbound Church Lane to B194	13%	14%	15%	15%	15%	<80%	<80%	<80%	<80%	15%	16%	18%	18%	18%	<80%	<80%	<80%	<80%
39	83201_94294	A1170 Northbound A1170 to Church Lane	14%	15%	16%	16%	17%	<80%	<80%	<80%	<80%	14%	16%	17%	17%	18%	<80%	<80%	<80%	<80%
40	94294_83201	A1170 Southbound A1170 to Church Lane	13%	14%	15%	15%	15%	<80%	<80%	<80%	<80%	15%	16%	18%	18%	18%	<80%	<80%	<80%	<80%
41	83204_83201	A1170 Eastbound A10 to A1170	12%	13%	13%	13%	13%	<80%	<80%	<80%	<80%	23%	24%	24%	24%	24%	<80%	<80%	<80%	<80%
42	83201_83205	A1170 Westbound A10 to A1170	22%	24%	24%	24%	25%	<80%	<80%	<80%	<80%	13%	14%	14%	14%	14%	<80%	<80%	<80%	<80%
43	99235_83200	A10 Northbound A1170 to B156	59%	63%	68%	68%	70%	<80%	<80%	<80%	<80%	55%	64%	68%	68%	76%	<80%	<80%	<80%	<80%
44	83207_83197	A10 Southbound A1170 to B156	52%	58%	61%	59%	69%	<80%	<80%	<80%	<80%	62%	71%	75%	75%	78%	<80%	<80%	<80%	<80%
45	83199_83201	A1170 Northbound B156 to B176	6%	10%	10%	10%	10%	<80%	<80%	<80%	<80%	18%	23%	23%	23%	23%	<80%	<80%	<80%	<80%
46	83201_83199	A1170 Southbound B156 to B176	17%	19%	19%	19%	19%	<80%	<80%	<80%	<80%	6%	12%	12%	12%	12%	<80%	<80%	<80%	<80%
47	83198_83201	B176 Northbound B156 to A1170	38%	38%	39%	39%	39%	<80%	<80%	<80%	<80%	18%	18%	18%	18%	18%	<80%	<80%	<80%	<80%
48	83201_83198	B176 Southbound B156 to A1170	16%	16%	17%	17%	17%	<80%	<80%	<80%	<80%	41%	41%	41%	41%	41%	<80%	<80%	<80%	<80%
49	83199_83198	B156 Eastbound A1170 to B176	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%	2%	2%	2%	2%	<80%	<80%	<80%	<80%
50	83198_83199	B156 Westbound A1170 to B176	2%	2%	2%	2%	2%	<80%	<80%	<80%	<80%	0%	0%	0%	0%	0%	0%	0%	0%	0%
51	99234_83199	B156 Southbound Longfield Lane to A1170	11%	18%	18%	20%	20%	<80%	<80%	<80%	<80%	30%	42%	42%	42%	44%	<80%	<80%	<80%	<80%
52	83199_99234	B156 Northbound Longfield Lane to A1170	26%	34%	35%	35%	35%	<80%	<80%	<80%	<80%	12%	26%	27%	27%	29%	<80%	<80%	<80%	<80%
53	94345_90676	A10 Northbound A1170 to Church Lane	59%	64%	70%	69%	71%	<80%	<80%	<80%	<80%	94%	106%	112%	112%	125%	Base >80%	Base >80%	Base >80%	Base >80%
54	90676_94345	A10 Southbound A1170 to Church Lane	90%	98%	104%	101%	116%	Base >80%	Base >80%	Base >80%	Base >80%	62%	69%	73%	73%	75%	<80%	<80%	<80%	<80%
55	95364_83198	B176 Northbound Church Lane to B156	38%	38%	39%	39%	39%	<80%	<80%	<80%	<80%	17%	17%	18%	18%	18%	<80%	<80%	<80%	<80%
56	95364_94347	B176 Southbound Church Lane to B156	16%	16%	16%	16%	16%	<80%	<80%	<80%	<80%	41%	41%	42%	42%	42%	<80%	<80%	<80%	<80%
57	94628_96489	Hammond St Rd Eastbound	8%	8%	8%	12%	13%	<80%	<80%	<80%	<80%	45%	47%	47%	47%	50%	<80%	<80%	<80%	<80%
58	96489_94628	Hammond St Rd Westbound	40%	41%	42%	43%	44%	<80%	<80%	<80%	<80%	9%	10%	10%	10%	14%	<80%	<80%	<80%	<80%
59	n/a	Longfield Ln Eastbound	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
60	n/a	Longfield Ln Westbound	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
61	97406_96489	Rosedale Way Northbound (north of Andrews Ln)	32%	40%	41%	42%	43%	<80%	<80%	<80%	<80%	9%	22%	23%	23%	26%	<80%	<80%	<80%	<80%
62	96489_97406	Rosedale Way Southbound (north of Andrews Ln)	8%	16%	16%	19%	21%	<80%	<80%	<80%	<80%	36%	53%	53%	53%	55%	<80%	<80%	<80%	<80%
63	94355_97406	Rosedale Way Northbound (south of Andrews Ln)	0%	13%	14%	19%	24%	<80%	<80%	<80%	<80%	0%	0%	0%	0%	0%	0%	0%	0%	0%
64	97406_94355	Rosedale Way Southbound (south of Andrews Ln)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	22%	22%	22%	33%	<80%	<80%	<80%	<80%
65	94352_96734	B156 Northbound Goff's Lane to Longfield Lane	11%	11%	12%	13%	13%	<80%	<80%	<80%	<80%	34%	35%	35%	35%	36%	<80%	<80%	<80%	<80%
66	96734_94352	B156 Southbound Goff's Lane to Longfield Lane	30%	31%	31%	31%	31%	<80%	<80%	<80%	<80%	12%	13%	13%	13%	14%	<80%	<80%	<80%	<80%
67	94345_94347	Church Lane Eastbound A10 to B176	68%	70%	73%	72%	73%	<80%	<80%	<80%	<80%	105%	115%	134%	134%	134%	Base >80%	Base >80%	Base >80%	Base >80%
68	94347_94345	Church Lane Westbound A10 to B176	98%	105%	140%	138%	140%	Base >80%	Base >80%	Base >80%	Base >80%	73%	75%	78%	78%	78%	<80%	<80%	<80%	<80%
69	96733_94350	B156 Eastbound West of B198	31%	31%	32%	40%	41%	<80%	<80%	<80%	<80%	100%	102%	102%	102%	106%	Base >80%	Base >80%	Base >80%	Base >80%
70	94350_96733	B156 Westbound West of B198	89%	90%	90%	93%	94%	Base >80%	Base >80%	Base >80%	Base >80%	35%	36%	36%	36%	44%	<80%	<80%	<80%	<80%
71	96738_94352	B156 Eastbound B198 to B156	22%	29%	29%	30%	30%	<80%	<80%	<80%	<80%	119%	141%	142%	142%	144%	Base >80%	Base >80%	Base >80%	Base >80%
72	96738_94355	B156 Westbound B198 to B156	106%	119%	120%	120%	121%	Base >80%	Base >80%	Base >80%	Base >80%	25%	39%	39%	39%	41%	<80%	<80%	<80%	<80%
73	94352_94359	College Road Eastbound A10 to B156	70%	107%	107%	107%	107%	Worse >80%	Worse >80%	Worse >80%	Worse >80%	30%	42%	42%	42%	42%	<80%	<80%	<80%	<80%
74	94359_94352	College Road Westbound A10 to B156	27%	34%	34%	34%	34%	<80%	<80%	<80%	<80%	79%	145%	146%	146%	146%	Worse >80%	Worse >80%	Worse >80%	Worse >80%
75	99210_94345	A10 Northbound B198 to Church Lane	81%	92%	95%	95%	98%	Base >80%	Base >80%	Base >80%	Base >80%	67%	87%	91%	91%	109%	Worse >80%	Worse >80%	Worse >80%	Worse >80%
76	99210_94359	A10 Southbound B198 to Church Lane	64%	78%	82%	80%	99%	<80%	Worse >80%	<80%	Worse >80%	86%	101%	104%	104%	108%	Base >80%	Base >80%	Base >80%	Base >80%
77	96741_94347	B178 Northbound B198 to Church Lane	1%	3%	10%	10%	10%	<80%	<80%	<80%	<80%	25%	27%	31%	31%	31%	<80%	<80%	<80%	<80%
78	96741_94360	B178 Southbound B198 to Church Lane	24%	25%	29%	28%	29%	<80%	<80%	<80%	<80%	1%	3%	8%	8%	8%	<80%	<80%	<80%	<80%
79	94359_94360	B198 Eastbound A10 to B176	0%	0%	0%	0%	0%	0%	0%	0%	0%	76%	85%	88%	88%	88%	Worse >80%	Worse >80%	Worse >80%	Worse >80%
80	94360_94359	B198 Westbound A10 to B176	70%	77%	80%	80%	80%	<80%	<80%	<80%	<80%	0%	0%	0%	0%	0%	0%	0%	0%	0%
81	94355_94374	B198 Eastbound B156 to Site 3	48%	52%	52%	56%	67%	<80%	<80%	<80%	<80%	39%	49%	49%	49%	58%	<80%	<80%	<80%	<80%
82	94374_94355	B198 Westbound B156 to Site 3	37%	43%	43%	45%	48%	<80%	<80%	<80%	<80%	51%	59%	59%	59%	75%	<80%	<80%	<80%	<80%
83	99209_94359	A10 Northbound B198 to Church Lane	53%	59%	62%	62%	64%	<80%	<80%	<80%	<80%	40%	47%	49%	49%	57%	<80%	<80%	<80%	<80%
84	94359_99209	A10 Southbound B198 to Church Lane	38%	43%	45%	44%	53%	<80%	<80%	<80%	<80%	56%	65%	67%	67%	70%	<80%	<80%	<80%	<80%
85	94333_94360	B178 Northbound Site 7 to B198	1%	5%	9%	9%	9%	<80%	<80%	<80%	<80%	8%	11%	15%	15%	15%	<80%	<80%	<80%	<80%
86	94360_94333	B178 Southbound Site 7 to B198	8%	11%	14%	13%	14%	<80%	<80%	<80%	<80%	1%	6%	9%	9%	9%	<80%	<80%	<80%	<80%
87	94355_94374	B198 Eastbound Site 3 to A10	48%	52%	56%	59%	70%	<80%	<80%	<80%	<80%	39%	48%	50%	50%	59%	<80%	<80%	<80%	<80%
88	94374_94355	B198 Westbound Site 3 to A10	37%	43%	44%	46%	50%	<80%	<80%	<80%	<80%	51%	59%	61%	61%	77%	<80%	<80%	<80%	<80%
89	94374_99209	A10 Northbound A121 to Site 7	45%	51%	53%	53%	55%	<80%	<80%	<80%	<80%	51%	61%	64%	64%	74%	<80%	<80%	<80%	<80%
90	99209_94374	A10 Southbound A121 to Site 7	49%	56%	59%	57%	69%	<80%	<80%	<80%	<80%	48%	56%	58%	58%	60%	<80%	<80%	<80%	<80%
91	94374_94333	A121 Eastbound A10 to B176	42%	54%	55%	56%	63%	<80%	<80%	<80%	<80%	41%	57%	58%	58%	84%	<80%	<80%	<80%	Worse >80%
92	94333_94374	A121 Westbound A10 to B176	39%	50%	51%	52%	76%	<80%	<80%	<80%	<80%	44%	63%	64%	64%	78%	<80%	<80%	<80%	<80%
93	94537_94374	A10 Northbound Park Lane Paradise to A121	61%	65%	65%	66%	69%	<80%	<80%	<80%	<80%	67%	72%	74%	74%	101%	<80%	<80%	<80%	Worse >80%
94	94374_94537	A10 Southbound Park Lane Paradise to A121	64%	67%	69%	70%	98%	<80%	<80%	<80%	Worse >80%	64%	70%	71%	71%	76%	<80%	<80%	<80%	<80%
95	83120_97195	A121 Northbound A1010 to B176	47%	57%	57%	57%	78%	<80%	<80%	<80%	<80%	62%	78%	79%	79%	91%	<80%	<80%	<80%	Worse >80%
96	97195_83120	A121 Southbound A1010 to B176	59%	71%	72%	73%	80%	<80%	<80%	<80%	<80%	50%	63%	64%	64%	86%	<80%	<80%	<80%	Worse >80%
97	83120_83122	A121 Eastbound A1010 to B194	52%	65%	66%	66%	78%	<80%	<80%	<80%	<80%	48%	62%	62%	62%	78%	<80%	<80%	<80%	<80%
98	83122_83120	A121 Westbound A1010 to B194	46%	56%	56%	56%	69%	<80%	<80%	<80%	<80%	55%	77%	78%	78%	99%	<80%	<80%	<80%	Worse >80%
99	85303_83122	A121 Southbound South of B194	45%	46%	46%	46%	49%	<80%	<80%	<80%	<80%	67%	68%	68%	68%	69%	<80%	<80%	<80%	<80%
100	83122_85303	A121 Northbound South of B194	63%	64%	64%	64%	65%	<80%	<80%	<80%	<80%	47%	49%	49%	49%	52%	<80%	<80%	<80%	<80%
101	83125_83122	B194 Eastbound East of A121	47%	49%	49%	49%	55%	<80%	<80%	<80%	<80%	38%	39%	40%	40%	41%	<80%	<80%	<80%	<80%
102	83122_83125	B194 Westbound East of A121	36%	37%	37%	37%	38%	<80%	<80%	<80%	<80%	49%	52%	53%	53%	58%	<80%	<80%	<80%	<80%
103	94537_94374	A10 Northbound M25 to Park Lane Paradise	61%	65%	65%	66%	76%	<80%	<80%	<80%	<80%	67%	72%	74%	74%	77%	<80%	<80%	<80%	<80%
104	94374_94537	A10 Southbound M25 to Park Lane Paradise	64%	67%	69%	70%	72%	<80%	<80%	<80%	<80%	64%	70%	71%	71%	83%	<80%	<80%	<80%	Worse >80%
105	73002_83120	A1010 Northbound M25 to A121	48%	50%	50%	51%	56%	<80%	<80%	<80%	<80%	32%	34%	34%	35%	35%	<80%	<80%	<80%	<80%
106	83120_73002	A1010 Southbound M25 to A121	31%	32%	33%	33%	34%	<80%	<80%	<80%	<80%	50%	54%	54%	54%	60%	<80%	<80%	<80%	<80%
107	83108_83109	M25 Eastbound West of A10	78%	78%	78%	78%	79%	<80%	<80%	<80%	<80%	89%	89%	89%	89%	90%	Base >80%	Base >80%	Base >80%	Base >80%
108	21085_83108	M25 Westbound West of A10	84%	85%	85%	85%	85%	Base >80%	Base >80%	Base >80%	Base >80%	82%	82%	82%	82%	83%	Base >80%	Base >80%	Base >80%	Base >80%
109	83118_83119	M25 Eastbound East of A10	81%	82%	82%	82%	82%	Base >80%	Base >80%	Base >80%	Base >80%	86%	87%	87%	87%	88%	Base >80%	Base >80%	Base >80%	Base >80%
110	83119_83118	M25 Westbound East of A10	82%	83%	83%	83%	84%	Base >80%	Base >80%	Base >80%	Base >80%	85%	86%	86%	86%	86%	Base >80%	Base >80%	Base >80%	Base >80%
111	73004_75004	A10 Northbound South of M25	38%	39%	39%	39%	43%	<80%	<80%	<80%	<80%	60%	64%	65%	65%	67%	<80%	<80%	<80%	<80%
112	75004_73004	A10 Southbound South of M25	57%	60%	61%	62%	63%	<80%	<80%	<80%	<80%	39%	42%	42%	42%	46%	<80%	<80%	<80%	<80%
113	73009_73003	A1010 Northbound South of M25	12%	19%	20%	20%	35%	<80%	<80%	<80%	<80%	1%	6%	7%	7%	10%	<80%	<80%	<80%	<80%
114	73003_73009	A1010 Southbound South of M25	1%	5%	6%	6%	8%	<80%	<80%	<80%	<80%	13%	23%	25%	25%	41%	<80%	<80%	<80%	<80%

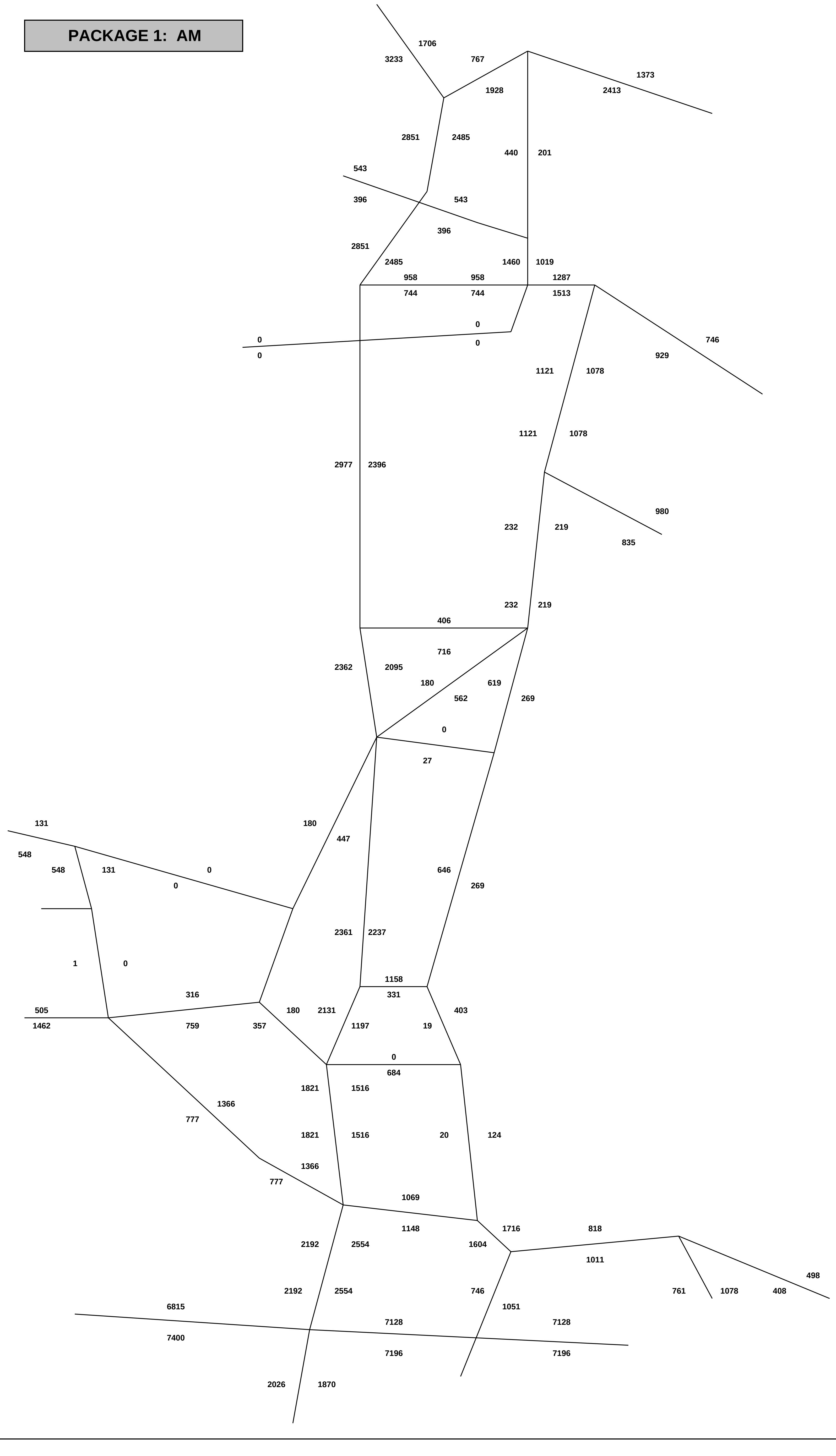
Appendix 9 – Composite model output - junctions

			AM									PM								
TAM turn	A_B_C	Description	P1	P2	P3	P4	P5	P2	P3	P4	P5	P1	P2	P3	P4	P5	P2	P3	P4	P5
90_91	99209_94374_94333	A10/Lt. Ellis Way N>E	5%	13%	13%	13%	16%	<80%	<80%	<80%	<80%	5%	17%	17%	17%	24%	<80%	<80%	<80%	<80%
90_94	99209_94374_94537	A10/Lt. Ellis Way N>S	46%	49%	51%	49%	52%	<80%	<80%	<80%	<80%	48%	53%	54%	53%	65%	<80%	<80%	<80%	<80%
90_88	99209_94374_94355	A10/Lt. Ellis Way N>W	4%	4%	7%	7%	8%	<80%	<80%	<80%	<80%	4%	4%	5%	5%	5%	<80%	<80%	<80%	<80%
92_89	94333_94374_99209	A10/Lt. Ellis Way E>N	15%	22%	22%	22%	25%	<80%	<80%	<80%	<80%	16%	26%	26%	26%	32%	<80%	<80%	<80%	<80%
92_94	94333_94374_94537	A10/Lt. Ellis Way E>S	21%	24%	24%	24%	26%	<80%	<80%	<80%	<80%	22%	26%	27%	27%	48%	<80%	<80%	<80%	<80%
92_88	94333_94374_94355	A10/Lt. Ellis Way E>W	16%	21%	22%	24%	24%	<80%	<80%	<80%	<80%	17%	27%	27%	29%	29%	<80%	<80%	<80%	<80%
93_89	94537_94374_99209	A10/Lt. Ellis Way S>N	50%	53%	55%	53%	56%	<80%	<80%	<80%	<80%	52%	57%	58%	57%	69%	<80%	<80%	<80%	<80%
93_91	94537_94374_94333	A10/Lt. Ellis Way S>E	21%	24%	25%	25%	27%	<80%	<80%	<80%	<80%	22%	27%	27%	27%	54%	<80%	<80%	<80%	<80%
93_88	94537_94374_94355	A10/Lt. Ellis Way S>W	20%	20%	21%	24%	25%	<80%	<80%	<80%	<80%	21%	22%	22%	24%	36%	<80%	<80%	<80%	<80%
87_89	94355_94374_99209	A10/Lt. Ellis Way W>N	5%	5%	9%	9%	9%	<80%	<80%	<80%	<80%	5%	5%	6%	6%	7%	<80%	<80%	<80%	<80%
87_91	94355_94374_94333	A10/Lt. Ellis Way W>E	28%	33%	34%	36%	36%	<80%	<80%	<80%	<80%	29%	39%	40%	41%	41%	<80%	<80%	<80%	<80%
87_94	94355_94374_94537	A10/Lt. Ellis Way W>S	32%	32%	33%	35%	36%	<80%	<80%	<80%	<80%	33%	34%	34%	36%	46%	<80%	<80%	<80%	<80%
76_79	99210_94359_94360	A10/College Rd N>E	0%	3%	6%	6%	6%	<80%	<80%	<80%	<80%	0%	5%	6%	6%	6%	<80%	<80%	<80%	<80%
76_84	99210_94359_99209	A10/College Rd N>S	111%	132%	145%	141%	150%	Base >80%	Base >80%	Base >80%	Base >80%	116%	148%	155%	152%	190%	Base >80%	Base >80%	Base >80%	Base >80%
76_74	99210_94359_94352	A10/College Rd N>W	54%	61%	61%	61%	61%	<80%	<80%	<80%	<80%	57%	72%	72%	72%	72%	<80%	<80%	<80%	<80%
80_75	94360_94359_99210	A10/College Rd E>N	36%	39%	41%	41%	41%	<80%	<80%	<80%	<80%	38%	42%	43%	43%	43%	<80%	<80%	<80%	<80%
80_84	94360_94359_99209	A10/College Rd E>S	110%	112%	115%	115%	115%	Base >80%	Base >80%	Base >80%	Base >80%	116%	119%	121%	121%	121%	Base >80%	Base >80%	Base >80%	Base >80%
80_74	94360_94359_94352	A10/College Rd E>W	110%	231%	243%	243%	243%	Base >80%	Base >80%	Base >80%	Base >80%	116%	320%	328%	328%	328%	Base >80%	Base >80%	Base >80%	Base >80%
83_75	99209_94359_99210	A10/College Rd S>N	99%	109%	115%	113%	117%	Base >80%	Base >80%	Base >80%	Base >80%	104%	119%	122%	120%	139%	Base >80%	Base >80%	Base >80%	Base >80%
83_79	99209_94359_94360	A10/College Rd S>E	0%	1%	3%	3%	3%	<80%	<80%	<80%	<80%	0%	2%	3%	3%	3%	<80%	<80%	<80%	<80%
83_74	99209_94359_94352	A10/College Rd S>W	0%	1%	1%	1%	4%	<80%	<80%	<80%	<80%	0%	2%	2%	2%	8%	<80%	<80%	<80%	<80%
73_75	94352_94359_99209	A10/College Rd W>N	133%	255%	255%	255%	255%	Base >80%	Base >80%	Base >80%	Base >80%	140%	390%	390%	390%	390%	Base >80%	Base >80%	Base >80%	Base >80%
73_79	94352_94359_94360	A10/College Rd W>E	0%	38%	42%	42%	42%	<80%	<80%	<80%	<80%	0%	65%	68%	68%	68%	<80%	<80%	<80%	<80%
73_84	94352_94359_99209	A10/College Rd W>S	133%	163%	163%	163%	227%	Base >80%	Base >80%	Base >80%	Base >80%	140%	185%	185%	185%	328%	Base >80%	Base >80%	Base >80%	Base >80%
54_67	90676_94345_94347	A10/Church Lane N>E	97%	97%	108%	106%	108%	Base >80%	Base >80%	Base >80%	Base >80%	102%	102%	106%	105%	106%	Base >80%	Base >80%	Base >80%	Base >80%
54_76	90676_94345_99210	A10/Church Lane N>S	79%	95%	104%	101%	107%	Worse >80%	Worse >80%	Worse >80%	Worse >80%	83%	105%	110%	108%	133%	Base >80%	Base >80%	Base >80%	Base >80%
68_53	94347_94345_90676	A10/Church Lane E>N	103%	103%	163%	152%	163%	Base >80%	Base >80%	Base >80%	Base >80%	108%	108%	129%	122%	129%	Base >80%	Base >80%	Base >80%	Base >80%
68_76	94347_94345_99210	A10/Church Lane E>S	103%	103%	103%	103%	103%	Base >80%	Base >80%	Base >80%	Base >80%	108%	108%	108%	108%	108%	Base >80%	Base >80%	Base >80%	Base >80%
65_53	99210_94345_90676	A10/Church Lane S>N	81%	81%	81%	81%	81%	Base >80%	Base >80%	Base >80%	Base >80%	86%	86%	86%	86%	86%	Base >80%	Base >80%	Base >80%	Base >80%
75_67	94333_94374_94355	A10/Church Lane S>E	16%	16%	16%	16%	16%	<80%	<80%	<80%	<80%	17%	17%	17%	17%	17%	<80%	<80%	<80%	<80%
28_41	90673_83207_83204	A10/A1170 TURNFORD N>E	26%	27%	27%	27%	27%	<80%	<80%	<80%	<80%	27%	29%	29%	29%	29%	<80%	<80%	<80%	<80%
28_41	83207_83204_83201	A10/A1170 TURNFORD N>E	9%	9%	9%	9%	9%	<80%	<80%	<80%	<80%	9%	10%	10%	10%	10%	<80%	<80%	<80%	<80%
28_44	90673_83207_83197	A10/A1170 TURNFORD N>S	56%	61%	68%	66%	69%	<80%	<80%	<80%	<80%	59%	66%	69%	68%	77%	<80%	<80%	<80%	<80%
42_27	83201_83205_83202	A10/A1170 TURNFORD E>N	22%	22%	22%	22%	22%	<80%	<80%	<80%	<80%	23%	23%	24%	23%	24%	<80%	<80%	<80%	<80%
42_27	83205_83202_83203	A10/A1170 TURNFORD E>N	21%	21%	22%	21%	22%	<80%	<80%	<80%	<80%	22%	23%	23%	23%	23%	<80%	<80%	<80%	<80%
42_27	83202_83203_83206	A10/A1170 TURNFORD E>N	39%	40%	40%	40%	40%	<80%	<80%	<80%	<80%	41%	42%	42%	42%	42%	<80%	<80%	<80%	<80%
42_27	83203_83206_21088	A10/A1170 TURNFORD E>N	18%	18%	18%	18%	18%	<80%	<80%	<80%	<80%	19%	19%	19%	19%	19%	<80%	<80%	<80%	<80%
43_27	99235_83200_83206	A10/A1170 TURNFORD S>N	58%	62%	68%	67%	69%	<80%	<80%	<80%	<80%	60%	67%	69%	68%	77%	<80%	<80%	<80%	<80%
43_27	83200_83206_21088	A10/A1170 TURNFORD S>N	56%	60%	67%	65%	68%	<80%	<80%	<80%	<80%	59%	65%	68%	67%	75%	<80%	<80%	<80%	<80%
43_41	99235_83200_83202	A10/A1170 TURNFORD S>E	11%	11%	11%	11%	11%	<80%	<80%	<80%	<80%	12%	12%	12%	12%	12%	<80%	<80%	<80%	<80%
43_41	83200_83202_83203	A10/A1170 TURNFORD S>E	4%	4%	4%	4%	4%	<80%	<80%	<80%	<80%	4%	4%	4%	4%	4%	<80%	<80%	<80%	<80%
43_41	83202_83203_83204	A10/A1170 TURNFORD S>E	4%	4%	4%	4%	4%	<80%	<80%	<80%	<80%	4%	4%	4%	4%	4%	<80%	<80%	<80%	<80%
43_41	83203_83204_83201	A10/A1170 TURNFORD S>E	3%	3%	3%	3%	3%	<80%	<80%	<80%	<80%	3%	3%	3%	3%	3%	<80%	<80%	<80%	<80%
16_21	90635_83215_83212	A10/A1170 HODDESDON N>E	40%	41%	41%	41%	41%	<80%	<80%	<80%	<80%	42%	44%	44%	44%	44%	<80%	<80%	<80%	<80%
16_21	83215_83212_94261	A10/A1170 HODDESDON N>E	17%	18%	18%	18%	18%	<80%	<80%	<80%	<80%	18%	19%	19%	19%	19%	<80%	<80%	<80%	<80%
16_28	90635_83215_83209	A10/A1170 HODDESDON N>S	56%	57%	58%	59%	59%	<80%	<80%	<80%	<80%	59%	62%	62%	62%	67%	<80%	<80%	<80%	<80%
16_28	83215_83209_21089	A10/A1170 HODDESDON N>S	48%	50%	50%	51%	51%	<80%	<80%	<80%	<80%	51%	53%	54%	54%	57%	<80%	<80%	<80%	<80%
22_15	94261_83213_83210	A10/A1170 HODDESDON E>N	10%	11%	11%	11%	11%	<80%	<80%	<80%	<80%	11%	12%	12%	12%	12%	<80%	<80%	<80%	<80%
22_15	83213_83210_83211	A10/A1170 HODDESDON E>N	8%	9%	9%	9%	9%	<80%	<80%	<80%	<80%	9%	9%	9%	9%	9%	<80%	<80%	<80%	<80%
22_15	83210_83211_83214	A10/A1170 HODDESDON E>N	16%	17%	17%	17%	17%	<80%	<80%	<80%	<80%	17%	18%	18%	18%	18%	<80%	<80%	<80%	<80%
22_15	83211_83214_21090	A10/A1170 HODDESDON E>N	7%	7%	7%	7%	7%	<80%	<80%	<80%	<80%	8%	8%	8%	8%	8%	<80%	<80%	<80%	<80%
22_15	83214_21090_90635	A10/A1170 HODDESDON E>N	71%	71%	71%	71%	71%	<80%	<80%	<80%	<80%	74%	75%	75%	75%	75%	<80%	<80%	<80%	<80%
22_28	94261_83213_83209	A10/A1170 HODDESDON E>S	25%	36%	49%	46%	51%	<80%	<80%	<80%	<80%	26%	43%	48%	46%	57%	<80%	<80%	<80%	<80%
22_28	83213_83209_21089	A10/A1170 HODDESDON E>S	11%	16%	22%	21%	23%	<80%	<80%	<80%	<80%	12%	20%	22%	21%	26%	<80%	<80%	<80%	<80%
22_28	83209_21089_90688	A10/A1170 HODDESDON E>S	60%	65%	71%	69%	72%	<80%	<80%	<80%	<80%	63%	70%	73%	72%	77%	<80%	<80%	<80%	<80%
27_15	90688_83208_83214	A10/A1170 HODDESDON S>N	71%	72%	73%	74%	74%	<80%	<80%	<80%	<80%	75%	77%	78%	78%	82%	<80%	<80%	<80%	Worse >80%
27_15	83208_83214_21090	A10/A1170 HODDESDON S>N	64%	65%	66%	66%	67%	<80%	<80%	<80%	<80%	67%	69%	70%	70%	74%	<80%	<80%	<80%	<80%
27_15	83214_21090_90635	A10/A1170 HODDESDON S>N	71%	72%	73%	73%	74%	<80%	<80%	<80%	<80%	74%	77%	77%	78%	81%	<80%	<80%	<80%	Worse >80%
27_21	90688_83208_83210	A10/A1170 HODDESDON S>E	42%	62%	87%	81%	91%	<80%	Worse >80%	Worse >80%	Worse >80%	44%	76%	85%	82%	102%	<80%	Worse >80%	Worse >80%	Worse >80%
27_21	83208_83210_83211	A10/A1170 HODDESDON S>E	11%	17%	23%	22%	24%	<80%	<80%	<80%	<80%	12%	20%	23%	22%	27%	<80%	<80%	<80%	<80%
27_21	83210_83211_83212	A10/A1170 HODDESDON S>E	14%	21%	29%	27%	30%	<80%	<80%	<80%	<80%	15%	25%	28%	27%	34%	<80%	<80%	<80%	<80%
27_21	83211_83212_94261	A10/A1170 HODDESDON S>E	23%	34%	47%	44%	50%	<80%	<80%	<80%	<80%	24%	41%	47%	45%	56%	<80%	<80%	<80%	<80%
2_3	90663_83227_83220	A10/A414 N>E	14%	14%	16%	14%	16%	<80%	<80%	<80%	<80%	15%	15%	16%	15%	16%	<80%	<80%	<80%	<80%
2_3	83227_83220_83223	A10/A414 N>E	6%	6%	7%	6%	7%	<80%	<80%	<80%	<80%	7%	7%	7%	7%	7%	<80%	<80%	<80%	<80%
2_8	90663_83227_83217	A10/A414 N>S	40%	41%	42%	42%	43%	<80%	<80%	<80%	<80%	42%	44%	45%	45%	48%	<80%	<80%	<80%	<80%
2_8	83227_83217_21091	A10/A414 N>S	38%	39%	40%	40%	40%	<80%	<80%	<80%	<80%	39%	42%	42%	43%	46%	<80%	<80%	<80%	<80%
2_8	83217_21091_90687	A10/A414 N>S	62%	63%	64%	64%	65%	<80%	<80%	<80%	<80%	65%	68%	68%	68%	71%	<80%	<80%	<80%	<80%
4_1	83222_83221_83218	A10/A414 E>N	34%	34%	35%	34%	35%	<80%	<80%	<80%	<80%	36%	36%	36%	36%	36%	<80%	<80%	<80%	<80%
4_1	83221_83218_83219	A10/A414 E>N	28%	28%	29%	28%	29%	<80%	<80%	<80%	<80%	29%	29%	30%	29%	30%	<80%	<80%	<80%	<80%
4_1	83218_83219_83226	A10/A414 E>N	52%	52%	53%	52%	53%	<80%	<80%	<80%	<80%	55%	55%	55%	55%	55%	<80%	<80%	<80%	<80%
4_1	83219_83226_21092	A10/A414 E>N	24%	24%	24%	24%	24%	<80%	<80%	<80%	<80%	25%	25%	25%	25%	25%	<80%	<80%	<80%	<80%
4_8	83222_83221_83217	A10/A414 E>S	48%	48%	48%	48%	48%	<80%	<80%	<80%	<80%	50%	50%	51%	51%	51%	<80%	<80%	<80%	<80%
4_8	83221_83217_21091	A10/A414 E>S	24%	24%	24%	25%	25%	<80%	<80%	<80%	<80%	26%	26%	26%	26%	26%	<80%	<80%	<80%	<80%
4_8	83217_21091_90687	A10/A414 E>S	62%	62%	62%	62%	62%	<80%	<80%	<80%	<80%	65%	65%	65%	65%	66%	<80%	<80%	<80%	<80%
7_1	90687_83216_83226	A10/A414 S>N	66%	68%	68%	69%	69%	<80%	<80%	<80%	<80%	69%	72%	73%	73%	77%	<80%	<80%	<80%	<80%
7_1	83216_83226_21092	A10/A414 S>N	57%	58%	59%	59%	60%	<80%	<80%	<80%	<80%	59%	62%	63%	63%	66%	<80%	<80%	<80%	<80%
7_3	90687_83216_83218	A10/A414 S>E	48%	48%	48%	48%	49%	<80%	<80%	<80%	<80%	50%	51%	51%	51%	52%	<80%	<80%	<80%	<80%
7_3	83216_83218_83219	A10/A414 S>E	19%	20%	20%	20%	20%	<80%	<80%	<80%	<80%	20%	21%	21%	21%	21%	<80%	<80%	<80%	<80%
7_3	83218_83219_83220	A10/A414 S>E	24%	25%	25%	25%	25%	<80%	<80%	<80%	<80%	26%	26%	26%	26%	27%	<80%	<80%	<80%	<80%
7_3	83219_83220_83223	A10/A414 S>E	17%	17%	17%	17%	17%	<80%	<80%	<80%	<80%	18%	18%	18%	18%	18%	<80%	<80%	<80%	<80%
104_109	94374_94537_99401	A10/M25 N>E	64%	64%	65%	65%	65%	<80%	<80%	<80%	<80%	67%	68%	68%	68%	71%	<80%	<80%	<80%	<80%
104_109	94537_99401_83113	A10/M25 N>E	101%	102%	103%	103%	104%	Base >80%	Base >80%	Base >80%	Base >80%	106%	108%	109%	109%	113%	Base >80%	Base >80%	Base >80%	Base >80%
104_109	99401_83113_83116	A10/M25 N>E	43%	45%	45%	45%	46%	<80%	<80%	<80%	<80%	46%	48%	48%	48%	53%	<80%	<80%	<80%	<80%
104_109	83113_83116_21086	A10/M25 N>E	59%	61%	62%	62%	64%	<80%	<80%	<80%	<80%	62%	66%	66%	66%	72%	<80%	<80%	<80%	<80%
104_109	83116_21086_83118	A10/M25 N>E	81%	82%	82%	82%	82%	Base >80%	Base >80%	Base >80%	Base >80%	85%	86%	86%	86%	87%	Base >80%	Base >80%	Base >80%	Base >80%
104_112	94374_94537_99401	A10/M25 N>S	64%	66%	67%	67%	68%	<80%	<80%	<80%	<80%	67%	70%	71%	71%	76%	<80%	<80%	<80%	<80%
104_112	94537_99401_83113	A10/M25 N>S	101%	105%	106%	107%	109%	Base >80%	Base >80%	Base >80%	Base >80%	106%	111%	112%	112%	121%	Base >80%	Base >80%	Base >80%	Base >80%
104_112	99401_83113_83114	A10/M25 N>S	72%	75%	76%	77%	78%	<80%	<80%	<80%	<80%	76%	80%	81%	81%	88%	<80%	Worse >80%	Worse >80%	Worse >80%
104_112	83113_83114_99229	A10/M25 N>S	76%	79%	80%	80%	82%	<80%	<80%	Worse >80%	Worse >80%	79%	84%	84%	85%	92%	Worse >80%	Worse >80%	Worse >80%	Worse >80%
104_112	83114_99229_75004	A10/M25 N>S	44%	46%	47%	47%	48%	<80%	<80%	<80%	<80%	46%	49%	49%	49%	55%	<80%	<80%	<80%	<80%
104_112	99229_75004_73004	A10/M25 N>S	35%	36%	37%	37%	38%	<80%	<80%	<80%	<80%	36%	39%	39%	39%	43%	<80%	<80%	<80%	<80%
104_108	94374_94537_99401	A10/M25 N>W	64%	64%	65%	65%	65%	<80%	<80%	<80%	<80%	67%	68%	68%	68%	71%	<80%	<80%	<80%	<80%
104_108	94537_99401_83113	A10/M25 N>W	101%	102%	103%	103%	104%	Base >80%	Base >80%	Base >80%	Base >80%	106%	108%	108%	108%	112%	Base >80%	Base >80%	Base >80%	Base >80%
104_108	99401_83113_83114	A10/M25 N>W	72%	73%	74%	74%	74%	<80%	<80%	<80%	<80%	76%	77%	78%	78%	81%	<80%	<80%	<80%	Worse >80%
104_108	83113_83114_99229	A10/M25 N>W	76%	77%	77%	77%	78%	<80%	<80%	<80%	<80%	79%	81%	81%	81%	84%	Worse >80%	Worse >80%	Worse >80%	Worse >80%
104_108	83114_99229_99402	A10/M25 N>W	52%	53%	54%	54%	55%	<80%	<80%	<80%	<80%	55%	56%	57%	57%	60%	<80%	<80%	<80%	<80%
104_108	99229_99402_83111	A10/M25 N>W	84%	86%	87%	87%	88%	Base >80%	Base >80%	Base >80%	Base >80%	89%	91%	92%	92%	97%	Base >80%	Base >80%	Base >80%	Base >80%
104_108	99402_83111_83110	A10/M25 N>W	66%	68%	69%	69%	70%	<80%	<80%	<80%	<80%	70%	72%	73%	73%	77%	<80%	<80%	<80%	<80%
104_108	83111_83110_21085	A10/M25 N>W	77%	79%	80%	80%	81%	<80%	<80%	<80%	Worse >80%	81%	83%	84%	84%	89%	Base >80%	Base >80%	Base >80%	Base >80%
110_103	83118_83117_83114	A10/M25 E>N	76%	78%	79%	79%	80%	<80%	<80%	<80%	Worse >80%	79%	83%	84%	84%	91%	Worse >80%	Worse >80%	Worse >80%	Worse >80%
110_103	83117_83114_99229	A10/M25 E>N	96%	99%	100%	100%	102%	Base >80%	Base >80%	Base >80%	Base >80%	101%	106%	107%	107%	116%	Base >80%	Base >80%	Base >80%	Base >80%
110_103	83114_99229_99402	A10/M25 E>N	52%	53%	54%	54%	55%	<80%	<80%	<80%	<80%	55%	57%	57%	57%	61%	<80%	<80%	<80%	<80%
110_103	99229_99402_83111	A10/M25 E>N	84%	86%	87%	87%	88%	Base >80%	Base >80%	Base >80%	Base >80%	89%	92%	92%	92%	98%	Base >80%	Base >80%	Base >80%	Base >80%
110_103	99402_83111_83112	A10/M25 E>N	63%	64%	64%	64%	65%	<80%	<80%	<80%	<80%	66%	68%	68%	68%	71%	<80%	<80%	<80%	<80%
110_103	83111_83112_99228	A10/M25 E>N	103%	104%	105%	105%	106%	Base >80%	Base >80%	Base >80%	Base >80%	108%	110%	111%	111%	116%	Base >80%	Base >80%	Base >80%	Base >80%
110_103	83112_99228_94537	A10/M25 E>N	68%	69%	70%	70%	70%	<80%	<80%	<80%	<80%	72%	73%	74%	74%	77%	<80%	<80%	<80%	<80%
110_103	99228_94537_94374	A10/M25 E>N	55%	55%	56%	56%	56%	<80%	<80%	<80%	<80%	57%	59%	59%	59%	62%	<80%	<80%	<80%	<80%
110_112	83118_83117_83114	A10/M25 E>S	76%	76%	76%	76%	76%	<80%	<80%	<80%	<80%	79%	79%	79%	79%	79%	<80%	<80%	<80%	<80%
110_112	83117_83114_99229	A10/M25 E>S	96%	96%	96%	96%	96%	Base >80%	Base >80%	Base >80%	Base >80%	101%	101%	101%	101%	101%	Base >80%	Base >80%	Base >80%	Base >80%
110_112	83114_99229_75004	A10/M25 E>S	44%	44%	44%	44%	44%	<80%	<80%	<80%	<80%	46%	46%	46%	46%	46%	<80%	<80%	<80%	<80%
110_112	99229_75004_73004	A10/M25 E>S	35%	35%	35%	35%	35%	<80%	<80%	<80%	<80%	36%	36%	36%	36%	36%	<80%	<80%	<80%	<80%
110_108	83118_83117_83110	A10/M25 E>W	80%	80%	80%	80%	80%	Base >80%	Base >80%	Base >80%	Base >80%	84%	84%	84%	84%	84%	Base >80%	Base >80%	Base >80%	Base >80%
110_108	83117_83110_21085	A10/M25 E>W	69%	69%	69%	69%	69%	<80%	<80%	<80%	<80%	73%	73%	73%	73%	73%	<80%	<80%	<80%	<80%
111_103	73004_75004_99402	A10/M25 S>N	38%	39%	40%	40%	41%	<80%	<80%	<80%	<80%	39%	42%	42%	42%	46%	<80%	<80%	<80%	<80%
111_103	75004_99402_83111	A10/M25 S>N	95%	99%	101%	102%	104%	Base >80%	Base >80%	Base >80%	Base >80%	100%	106%	107%	108%	118%	Base >80%	Base >80%	Base >80%	Base >80%
111_103	99402_83111_83112	A10/M25 S>N	63%	65%	66%	67%	68%	<80%	<80%	<80%	<80%	66%	70%	70%	70%	76%	<80%	<80%	<80%	<80%
111_103	83111_83112_99228	A10/M25 S>N	103%	107%	109%	109%	111%	Base >80%	Base >80%	Base >80%	Base >80%	108%	114%	115%	115%	125%	Base >80%	Base >80%	Base >80%	Base >80%
111_103	83112_99228_94537	A10/M25 S>N	68%	71%	72%	73%	74%	<80%	<80%	<80%	<80%	72%	76%	76%	77%	83%	<80%	<80%	<80%	Worse >80%
111_103	99228_94537_94374	A10/M25 S>N	55%	57%	58%	58%	59%	<80%	<80%	<80%	<80%	57%	60%	61%	61%	67%	<80%	<80%	<80%	<80%
111_109	73004_75004_99402	A10/M25 S>E	38%	38%	38%	38%	38%	<80%	<80%	<80%	<80%	39%	39%	39%	39%	39%	<80%	<80%	<80%	<80%
111_109	75004_99402_83111	A10/M25 S>E	95%	95%	95%	95%	95%	Base >80%	Base >80%	Base >80%	Base >80%	100%	100%	100%	100%	100%	Base >80%	Base >80%	Base >80%	Base >80%
111_109	99402_83111_83112	A10/M25 S>E	63%	63%	63%	63%	63%	<80%	<80%	<80%	<80%	66%	66%	66%	66%	66%	<80%	<80%	<80%	<80%
111_109	83111_83112_99228	A10/M25 S>E	103%	103%	103%	103%	103%	Base >80%	Base >80%	Base >80%	Base >80%	108%	108%	108%	108%	108%	Base >80%	Base >80%	Base >80%	Base >80%
111_109	83112_99228_99401	A10/M25 S>E	33%	33%	33%	33%	33%	<80%	<80%	<80%	<80%	35%	35%	35%	35%	35%	<80%	<80%	<80%	<80%
111_109	99228_99401_83113	A10/M25 S>E	31%	31%	31%	31%	31%	<80%	<80%	<80%	<80%	32%	32%	32%	32%	32%	<80%	<80%	<80%	<80%
111_109	99401_83113_83116	A10/M25 S>E	43%	43%	43%	43%	43%	<80%	<80%	<80%	<80%	46%	46%	46%	46%	46%	<80%	<80%	<80%	<80%
111_109	83113_83116_21086	A10/M25 S>E	59%	59%	59%	59%	59%	<80%	<80%	<80%	<80%	62%	62%	62%	62%	62%	<80%	<80%	<80%	<80%
111_109	83116_21086_83118	A10/M25 S>E	81%	81%	81%	81%	81%	Base >80%	Base >80%	Base >80%	Base >80%	85%	85%	85%	85%	85%	Base >80%	Base >80%	Base >80%	Base >80%
111_108	73004_75004_99402	A10/M25 S>W	38%	38%	38%	38%	38%	<80%	<80%	<80%	<80%	39%	39%	39%	39%	39%	<80%	<80%	<80%	<80%
111_108	75004_99402_83111	A10/M25 S>W	95%	95%	95%	95%	95%	Base >80%	Base >80%	Base >80%	Base >80%	100%	100%	100%	100%	100%	Base >80%	Base >80%	Base >80%	Base >80%
111_108	99402_83111_83110	A10/M25 S>W	66%	66%	66%	66%	66%	<80%	<80%	<80%	<80%	70%	70%	70%	70%	70%	<80%	<80%	<80%	<80%
111_108	83111_83110_21085	A10/M25 S>W	77%	77%	77%	77%	77%	<80%	<80%	<80%	<80%	81%	81%	81%	81%	81%	Base >80%	Base >80%	Base >80%	Base >80%
107_103	83108_83109_83112	A10/M25 W>N	58%	61%	62%	62%	64%	<80%	<80%	<80%	<80%	61%	65%	66%	66%	74%	<80%	<80%	<80%	<80%
107_103	83109_83112_99228	A10/M25 W>N	47%	49%	50%	50%	52%	<80%	<80%	<80%	<80%	49%	52%	53%	53%	59%	<80%	<80%	<80%	<80%
107_103	83112_99228_94537	A10/M25 W>N	68%	69%	70%	70%	71%	<80%	<80%	<80%	<80%	72%	73%	73%	74%	76%	<80%	<80%	<80%	<80%
107_103	99228_94537_94374	A10/M25 W>N	55%	55%	56%	56%	56%	<80%	<80%	<80%	<80%	57%	58%	59%	59%	61%	<80%	<80%	<80%	<80%
107_109	83108_83109_83116	A10/M25 W>E	76%	76%	76%	76%	76%	<80%	<80%	<80%	<80%	79%	79%	79%	79%	79%	<80%	<80%	<80%	<80%
107_109	83109_83116_21086	A10/M25 W>E	70%	70%	70%	70%	70%	<80%	<80%	<80%	<80%	73%	73%	73%	73%	73%	<80%	<80%	<80%	<80%
107_112	83108_83109_83112	A10/M25 W>S	58%	58%	58%	58%	58%	<80%	<80%	<80%	<80%	61%	61%	61%	61%	61%	<80%	<80%	<80%	<80%
107_112	83109_83112_99228	A10/M25 W>S	47%	47%	47%	47%	47%	<80%	<80%	<80%	<80%	49%	49%	49%	49%	49%	<80%	<80%	<80%	<80%
107_112	83112_99228_99401	A10/M25 W>S	33%	33%	33%	33%	33%	<80%	<80%	<80%	<80%	35%	35%	35%	35%	35%	<80%	<80%	<80%	<80%
107_112	99228_99401_83113	A10/M25 W>S	31%	31%	31%	31%	31%	<80%	<80%	<80%	<80%	32%	32%	32%	32%	32%	<80%	<80%	<80%	<80%
107_112	99401_83113_83114	A10/M25 W>S	72%	72%	72%	72%	72%	<80%	<80%	<80%	<80%	76%	76%	76%	76%	76%	<80%	<80%	<80%	<80%
107_112	83113_83114_99229	A10/M25 W>S	76%	76%	76%	76%	76%	<80%	<80%	<80%	<80%	79%	79%	79%	79%	79%	<80%	<80%	<80%	<80%
107_112	83114_99229_75004	A10/M25 W>S	44%	44%	44%	44%	44%	<80%	<80%	<80%	<80%	46%	46%	46%	46%	46%	<80%	<80%	<80%	<80%
107_112	99229_75004_73004	A10/M25 W>S	35%	35%	35%	35%	35%	<80%	<80%	<80%	<80%	36%	36%	36%	36%	36%	<80%	<80%	<80%	<80%

			AM									PM								
TAM turn	A_B_C	Description	P1	P2	P3	P4	P5	P2	P3	P4	P5	P1	P2	P3	P4	P5	P2	P3	P4	P5
44_54	83207_83197_21087	Brookfield A10/A1170 N>S	52%	58%	64%	63%	66%	<80%	<80%	<80%	<80%	55%	63%	66%	65%	73%	<80%	<80%	<80%	<80%
44_54	83197_21087_90676	Brookfield A10/A1170 N>S	56%	61%	68%	66%	69%	<80%	<80%	<80%	<80%	58%	67%	69%	68%	77%	<80%	<80%	<80%	<80%
44_54	21087_90676_94345	Brookfield A10/A1170 N>S	56%	61%	68%	66%	69%	<80%	<80%	<80%	<80%	58%	67%	69%	68%	77%	<80%	<80%	<80%	<80%
46_49	83201_83199_83198	Brookfield A10/A1170 NE>E	0%	0%	0%	0%	0%	<80%	<80%	<80%	<80%	0%	0%	0%	0%	0%	<80%	<80%	<80%	<80%
46_54	83201_83199_83197	Brookfield A10/A1170 NE>S	5%	5%	5%	5%	5%	<80%	<80%	<80%	<80%	5%	5%	5%	5%	5%	<80%	<80%	<80%	<80%
46_54	83199_83197_21087	Brookfield A10/A1170 NE>S	4%	4%	4%	4%	4%	<80%	<80%	<80%	<80%	4%	4%	4%	4%	4%	<80%	<80%	<80%	<80%
46_54	83197_21087_90676	Brookfield A10/A1170 NE>S	56%	56%	56%	56%	56%	<80%	<80%	<80%	<80%	58%	59%	59%	59%	59%	<80%	<80%	<80%	<80%
46_54	21087_90676_94345	Brookfield A10/A1170 NE>S	56%	56%	56%	56%	56%	<80%	<80%	<80%	<80%	58%	59%	59%	59%	59%	<80%	<80%	<80%	<80%
46_52	83201_83199_99234	Brookfield A10/A1170 NE>SW	13%	15%	15%	15%	15%	<80%	<80%	<80%	<80%	14%	17%	17%	17%	17%	<80%	<80%	<80%	<80%
46_52	83199_99234_96734	Brookfield A10/A1170 NE>SW	26%	29%	29%	29%	29%	<80%	<80%	<80%	<80%	28%	34%	34%	34%	34%	<80%	<80%	<80%	<80%
50_45	83198_83199_83201	Brookfield A10/A1170 E>NE	0%	0%	0%	0%	0%	<80%	<80%	<80%	<80%	0%	0%	0%	0%	0%	<80%	<80%	<80%	<80%
50_54	83198_83199_83197	Brookfield A10/A1170 E>S	0%	0%	0%	0%	0%	<80%	<80%	<80%	<80%	0%	0%	0%	0%	0%	<80%	<80%	<80%	<80%
50_54	83199_83197_21087	Brookfield A10/A1170 E>S	4%	4%	4%	4%	4%	<80%	<80%	<80%	<80%	4%	4%	4%	4%	4%	<80%	<80%	<80%	<80%
50_54	83197_21087_90676	Brookfield A10/A1170 E>S	56%	56%	56%	56%	56%	<80%	<80%	<80%	<80%	58%	58%	58%	58%	58%	<80%	<80%	<80%	<80%
50_54	21087_90676_94345	Brookfield A10/A1170 E>S	56%	56%	56%	56%	56%	<80%	<80%	<80%	<80%	58%	58%	58%	58%	58%	<80%	<80%	<80%	<80%
50_52	83198_83199_99234	Brookfield A10/A1170 E>SW	2%	2%	2%	2%	2%	<80%	<80%	<80%	<80%	2%	2%	2%	2%	2%	<80%	<80%	<80%	<80%
50_52	83199_99234_96734	Brookfield A10/A1170 E>SW	26%	26%	26%	26%	26%	<80%	<80%	<80%	<80%	28%	28%	28%	28%	28%	<80%	<80%	<80%	<80%
53_43	94345_90676_99235	Brookfield A10/A1170 S>N	59%	63%	69%	68%	70%	<80%	<80%	<80%	<80%	62%	68%	70%	69%	78%	<80%	<80%	<80%	<80%
53_43	90676_99235_83200	Brookfield A10/A1170 S>N	59%	63%	69%	68%	70%	<80%	<80%	<80%	<80%	62%	68%	70%	69%	78%	<80%	<80%	<80%	<80%
53_45	94345_90676_99235	Brookfield A10/A1170 S>NE	59%	60%	61%	61%	61%	<80%	<80%	<80%	<80%	62%	64%	64%	64%	64%	<80%	<80%	<80%	<80%
53_45	90676_99235_99234	Brookfield A10/A1170 S>NE	0%	8%	8%	8%	9%	<80%	<80%	<80%	<80%	0%	10%	11%	11%	13%	<80%	<80%	<80%	<80%
53_45	99235_99234_83199	Brookfield A10/A1170 S>NE	0%	4%	5%	5%	5%	<80%	<80%	<80%	<80%	0%	6%	6%	6%	7%	<80%	<80%	<80%	<80%
53_45	99234_83199_83201	Brookfield A10/A1170 S>NE	11%	14%	15%	15%	15%	<80%	<80%	<80%	<80%	11%	16%	17%	17%	17%	<80%	<80%	<80%	<80%
53_49	94345_90676_99235	Brookfield A10/A1170 S>E	59%	59%	59%	59%	59%	<80%	<80%	<80%	<80%	62%	62%	62%	62%	62%	<80%	<80%	<80%	<80%
53_49	90676_99235_99234	Brookfield A10/A1170 S>E	0%	0%	0%	0%	0%	<80%	<80%	<80%	<80%	0%	0%	0%	0%	0%	<80%	<80%	<80%	<80%
53_49	99235_99234_83199	Brookfield A10/A1170 S>E	0%	0%	0%	0%	0%	<80%	<80%	<80%	<80%	0%	0%	0%	0%	0%	<80%	<80%	<80%	<80%
53_49	99234_83199_83198	Brookfield A10/A1170 S>E	0%	0%	0%	0%	0%	<80%	<80%	<80%	<80%	0%	0%	0%	0%	0%	<80%	<80%	<80%	<80%
53_52	94345_90676_99235	Brookfield A10/A1170 S>SW	59%	59%	59%	59%	59%	<80%	<80%	<80%	<80%	62%	62%	62%	62%	62%	<80%	<80%	<80%	<80%
53_52	90676_99235_99234	Brookfield A10/A1170 S>SW	0%	0%	0%	0%	0%	<80%	<80%	<80%	<80%	0%	0%	0%	0%	0%	<80%	<80%	<80%	<80%
53_52	99235_99234_96734	Brookfield A10/A1170 S>SW	0%	0%	0%	0%	0%	<80%	<80%	<80%	<80%	0%	0%	0%	0%	0%	<80%	<80%	<80%	<80%
51_45	96734_99234_83199	Brookfield A10/A1170 SW>NE	11%	14%	14%	14%	14%	<80%	<80%	<80%	<80%	11%	17%	18%	17%	18%	<80%	<80%	<80%	<80%
51_45	99234_83199_83201	Brookfield A10/A1170 SW>NE	11%	14%	14%	14%	14%	<80%	<80%	<80%	<80%	11%	17%	18%	17%	18%	<80%	<80%	<80%	<80%
51_49	96734_99234_83199	Brookfield A10/A1170 SW>E	11%	11%	11%	11%	11%	<80%	<80%	<80%	<80%	11%	11%	11%	11%	11%	<80%	<80%	<80%	<80%
51_49	99234_83199_83198	Brookfield A10/A1170 SW>E	0%	0%	0%	0%	0%	<80%	<80%	<80%	<80%	0%	0%	0%	0%	0%	<80%	<80%	<80%	<80%
51_54	96734_99234_83199	Brookfield A10/A1170 SW>S	11%	11%	11%	11%	11%	<80%	<80%	<80%	<80%	11%	11%	11%	11%	11%	<80%	<80%	<80%	<80%
51_54	99234_83199_83197	Brookfield A10/A1170 SW>S	0%	0%	0%	0%	0%	<80%	<80%	<80%	<80%	0%	0%	0%	0%	0%	<80%	<80%	<80%	<80%
51_54	83199_83197_21087	Brookfield A10/A1170 SW>S	4%	4%	4%	4%	4%	<80%	<80%	<80%	<80%	4%	4%	4%	4%	4%	<80%	<80%	<80%	<80%
51_54	83197_21087_90676	Brookfield A10/A1170 SW>S	56%	56%	56%	56%	56%	<80%	<80%	<80%	<80%	58%	58%	58%	58%	58%	<80%	<80%	<80%	<80%
51_54	21087_90676_94345	Brookfield A10/A1170 SW>S	56%	56%	56%	56%	56%	<80%	<80%	<80%	<80%	58%	58%	58%	58%	58%	<80%	<80%	<80%	<80%
34_35	96719_94294_97277	High Rd (A1170) / Station Rd (B194) S>E	68%	68%	68%	68%	68%	<80%	<80%	<80%	<80%	72%	72%	72%	72%	72%	<80%	<80%	<80%	<80%
34_38	96719_94294_83201	High Rd (A1170) / Station Rd (B194) S>S	38%	38%	38%	38%	38%	<80%	<80%	<80%	<80%	40%	40%	40%	40%	40%	<80%	<80%	<80%	<80%
36_38	97277_94294_83201	High Rd (A1170) / Station Rd (B194) W>N	29%	32%	35%	35%	35%	<80%	<80%	<80%	<80%	30%	34%	37%	37%	37%	<80%	<80%	<80%	<80%
36_33	97277_94294_96719	High Rd (A1170) / Station Rd (B194) W>N	68%	68%	69%	69%	69%	<80%	<80%	<80%	<80%	71%	72%	72%	72%	74%	<80%	<80%	<80%	<80%
37_33	83201_94294_96719	High Rd (A1170) / Station Rd (B194) N>E	30%	32%	33%	33%	33%	<80%	<80%	<80%	<80%	32%	32%	32%	32%	32%	<80%	<80%	<80%	<80%
37_35	83201_94294_97277	High Rd (A1170) / Station Rd (B194) N>N	15%	15%	16%	16%	16%	<80%	<80%	<80%	<80%	16%	18%	19%	19%	19%	<80%	<80%	<80%	<80%
25_32	96718_94262_96720	A1170 / Essex Rd E>SE	11%	11%	11%	11%	11%	<80%	<80%	<80%	<80%	12%	12%	12%	12%	12%	<80%	<80%	<80%	<80%
25_30	96718_94262_96719	A1170 / Essex Rd E>SE	20%	20%	20%	20%	20%	<80%	<80%	<80%	<80%	21%	21%	21%	21%	22%	<80%	<80%	<80%	<80%
31_30	96720_94262_96719	A1170 / Essex Rd NW>S	42%	45%	48%	48%	48%	<80%	<80%	<80%	<80%	44%	48%	50%	50%	50%	<80%	<80%	<80%	<80%
31_26	96720_94262_96718	A1170 / Essex RdNW>W	70%	70%	70%	70%	70%	<80%	<80%	<80%	<80%	74%	74%	74%	74%	74%	<80%	<80%	<80%	<80%
29_26	96719_94262_96718	A1170 / Essex Rd N>W	35%	35%	36%	36%	37%	<80%	<80%	<80%	<80%	36%	37%	37%	37%	37%	<80%	<80%	<80%	<80%
29_32	96719_94262_96720	A1170 / Essex Rd N>SE	17%	17%	18%	17%	18%	<80%	<80%	<80%	<80%	18%	19%	20%	20%	20%	<80%	<80%	<80%	<80%
40_48	94294_83201_83198	A1170 / B176 High Rd Turnford S>S	25%	25%	25%	25%	25%	<80%	<80%	<80%	<80%	26%	26%	26%	26%	26%	<80%	<80%	<80%	<80%
40_46	94294_83201_83199	A1170 / B176 High Rd Turnford S>SW	33%	33%	34%	34%	34%	<80%	<80%	<80%	<80%	35%	35%	35%	35%	35%	<80%	<80%	<80%	<80%
40_42	94294_83201_83205	A1170 / B176 High Rd Turnford S>W	23%	24%	24%	24%	24%	<80%	<80%	<80%	<80%	25%	25%	25%	25%	25%	<80%	<80%	<80%	<80%
47_39	83198_83201_94294	A1170 / B176 High Rd Turnford N>N	14%	15%	16%	16%	17%	<80%	<80%	<80%	<80%	15%	16%	16%	16%	17%	<80%	<80%	<80%	<80%
47_46	83198_83201_83199	A1170 / B176 High Rd Turnford N>SW	0%	0%	0%	0%	0%	<80%	<80%	<80%	<80%	0%	0%	1%	1%	1%	<80%	<80%	<80%	<80%
47_42	83198_83201_83205	A1170 / B176 High Rd Turnford N>W	30%	30%	30%	30%	30%	<80%	<80%	<80%	<80%	32%	32%	32%	32%	32%	<80%	<80%	<80%	<80%
45_39	83199_83201_94294	A1170 / B176 High Rd Turnford NE>N	5%	5%	5%	6%	6%	<80%	<80%	<80%	<80%	5%	5%	5%	5%	5%	<80%	<80%	<80%	<80%
45_48	83199_83201_83198	A1170 / B176 High Rd Turnford NE>S	0%	0%	0%	0%	0%	<80%	<80%	<80%	<80%	0%	0%	0%	1%	1%	<80%	<80%	<80%	<80%
45_42	83199_83201_83205	A1170 / B176 High Rd Turnford NE>W	1%	1%	1%	1%	1%	<80%	<80%	<80%	<80%	1%	1%	1%	1%	1%	<80%	<80%	<80%	<80%
41_39	83204_83201_94294	A1170 / B176 High Rd Turnford E>N	8%	8%	8%	8%	8%	<80%	<80%	<80%	<80%	8%	8%	8%	8%	8%	<80%	<80%	<80%	<80%
41_48	83204_83201_83198	A1170 / B176 High Rd Turnford E>S	0%	0%	0%	0%	0%	<80%	<80%	<80%	<80%	0%	0%	0%	0%	0%	<80%	<80%	<80%	<80%
41_46	83204_83201_83199	A1170 / B176 High Rd Turnford E>SW	6%	6%	6%	6%	6%	<80%	<80%	<80%	<80%	6%	6%	6%	6%	6%	<80%	<80%	<80%	<80%
78_86	96741_94360_94333	B176 / College Rd S>S	1%	2%	2%	2%	2%	<80%	<80%	<80%	<80%	1%	1%	1%	1%	1%	<80%	<80%	<80%	<80%
78_80	96741_94360_94359	B176 / College Rd S>W	3%	3%	3%	3%	3%	<80%	<80%	<80%	<80%	3%	3%	4%	3%	4%	<80%	<80%	<80%	<80%
85_77	94333_94360_96741	B176 / College Rd N>N	0%	0%	1%	1%	1%	<80%	<80%	<80%	<80%	0%	0%	0%	0%	0%	<80%	<80%	<80%	<80%
85_80	94333_94360_94359	B176 / College Rd N>W	4%	4%	5%	4%	5%	<80%	<80%	<80%	<80%	4%	5%	5%	5%	5%	<80%	<80%	<80%	<80%
79_77	94359_94360_96741	B176 / College Rd E>N	0%	0%	0%	0%	0%	<80%	<80%	<80%	<80%	0%	0%	0%	0%	0%	<80%	<80%	<80%	<80%
79_86	94359_94360_94333	B176 / College Rd E>S	0%	0%	0%	0%	0%	<80%	<80%	<80%	<80%	0%	0%	0%	0%	0%	<80%	<80%	<80%	<80%
86_96	94360_94333_97195	B176 / A121 S>S	111%	116%	119%	117%	119%	Base >80%	Base >80%	Base >80%	Base >80%	116%	118%	118%	118%	118%	Base >80%	Base >80%	Base >80%	Base >80%
86_92	94360_94333_94374	B176 / A121 S>W	111%	111%	111%	111%	111%	Base >80%	Base >80%	Base >80%	Base >80%	116%	129%	133%	130%	133%	Base >80%	Base >80%	Base >80%	Base >80%
95_85	97195_94333_94360	B176 / A121 N>N	42%	42%	42%	42%	42%	<80%	<80%	<80%	<80%	44%	44%	44%	44%	44%	<80%	<80%	<80%	<80%
95_92	97195_94333_94374	B176 / A121 N>W	27%	38%	40%	38%	40%	<80%	<80%	<80%	<80%	29%	32%	33%	33%	33%	<80%	<80%	<80%	<80%
91_85	94374_94333_94360	B176 / A121 E>N	27%	32%	32%	34%	38%	<80%	<80%	<80%	<80%	29%	47%	47%	49%	78%	<80%	<80%	<80%	<80%
91_96	94374_94333_97195	B176 / A121 E>S	25%	29%	30%	32%	36%	<80%	<80%	<80%	<80%	26%	26%	26%	26%	26%	<80%	<80%	<80%	<80%
96_97	97195_83120_83122	A121/A1010 Waltham Cross S>E	38%	46%	46%	46%	47%	<80%	<80%	<80%	<80%	39%	58%	59%	60%	91%	<80%	<80%	<80%	Worse >80%
96_106	97195_83120_73002	A121/A1010 Waltham Cross S>S	44%	52%	52%	53%	54%	<80%	<80%	<80%	<80%	46%	60%	60%	60%	64%	<80%	<80%	<80%	<80%
98_95	83122_83120_97195	A121/A1010 Waltham Cross W>N	44%	51%	51%	51%	51%	<80%	<80%	<80%	<80%	46%	48%	48%	48%	52%	<80%	<80%	<80%	<80%
98_106	83122_83120_73002	A121/A1010 Waltham Cross W>S	7%	9%	10%	10%	11%	<80%	<80%	<80%	<80%	7%	31%	32%	31%	39%	<80%	<80%	<80%	<80%
105_95	73002_83120_97195	A121/A1010 Waltham Cross N>N	45%	45%	45%	45%	45%	<80%	<80%	<80%	<80%	48%	49%	49%	49%	49%	<80%	<80%	<80%	<80%
105_97	73002_83120_83122	A121/A1010 Waltham Cross N>E	7%	11%	12%	13%	15%	<80%	<80%	<80%	<80%	7%	12%	13%	14%	23%	<80%	<80%	<80%	<80%
64_71	97406_94355_96738	Lt Ellis Way / Goffs Lane S>E	112%	119%	119%	119%	119%	Base >80%	Base >80%	Base >80%	Base >80%	118%	126%	126%	126%	126%	Base >80%	Base >80%	Base >80%	Base >80%
64_81	97406_94355_94374	Lt Ellis Way / Goffs Lane S>SE	112%	124%	125%	130%	133%	Base >80%	Base >80%	Base >80%	Base >80%	118%	139%	139%	139%	144%	Base >80%	Base >80%	Base >80%	Base >80%
64_70	97406_94355_94350	Lt Ellis Way / Goffs Lane S>W	112%	127%	128%	128%	131%	Base >80%	Base >80%	Base >80%	Base >80%	118%	153%	153%	159%	193%	Base >80%	Base >80%	Base >80%	Base >80%
72_63	96738_94355_97406	Lt Ellis Way / Goffs Lane W>N	106%	144%	145%	177%	187%	Base >80%	Base >80%	Base >80%	Base >80%	111%	112%	112%	120%	120%	Base >80%	Base >80%	Base >80%	Base >80%
72_81	96738_94355_94374	Lt Ellis Way / Goffs Lane W>SE	106%	106%	106%	106%	106%	Base >80%	Base >80%	Base >80%	Base >80%	111%	270%	272%	272%	314%	Base >80%	Base >80%	Base >80%	Base >80%
72_70	96738_94355_94350	Lt Ellis Way / Goffs Lane S>W	106%	108%	109%	108%	109%	Base >80%	Base >80%	Base >80%	Base >80%	111%	111%	111%	111%	111%	Base >80%	Base >80%	Base >80%	Base >80%
82_63	94374_94355_97406	Lt Ellis Way / Goffs Lane NW>N	23%	28%	28%	29%	30%	<80%	<80%	<80%	<80%	24%	24%	25%	25%	25%	<80%	<80%	<80%	<80%
82_71	94374_94355_96738	Lt Ellis Way / Goffs Lane NW>E	0%	1%	1%	5%	5%	<80%	<80%	<80%	<80%	0%	16%	16%	19%	34%	<80%	<80%	<80%	<80%
82_70	94374_94355_94350	Lt Ellis Way / Goffs Lane NW>W	22%	23%	23%	23%	23%	<80%	<80%	<80%	<80%	23%	23%	23%	23%	23%	<80%	<80%	<80%	<80%
69_63	94350_94355_97406	Lt Ellis Way / Goffs Lane E>N	18%	18%	18%	32%	32%	<80%	<80%	<80%	<80%	19%	20%	20%	24%	26%	<80%	<80%	<80%	<80%
69_71	94350_94355_96738	Lt Ellis Way / Goffs Lane E>E	10%	10%	10%	12%	12%	<80%	<80%	<80%	<80%	10%	10%	10%	13%	13%	<80%	<80%	<80%	<80%
69_81	94350_94355_94374	Lt Ellis Way / Goffs LaneE>SE	27%	27%	28%	32%	33%	<80%	<80%	<80%	<80%	28%	29%	29%	30%	30%	<80%	<80%	<80%	<80%

Appendix 10 – Package specific link flows

PACKAGE 1: AM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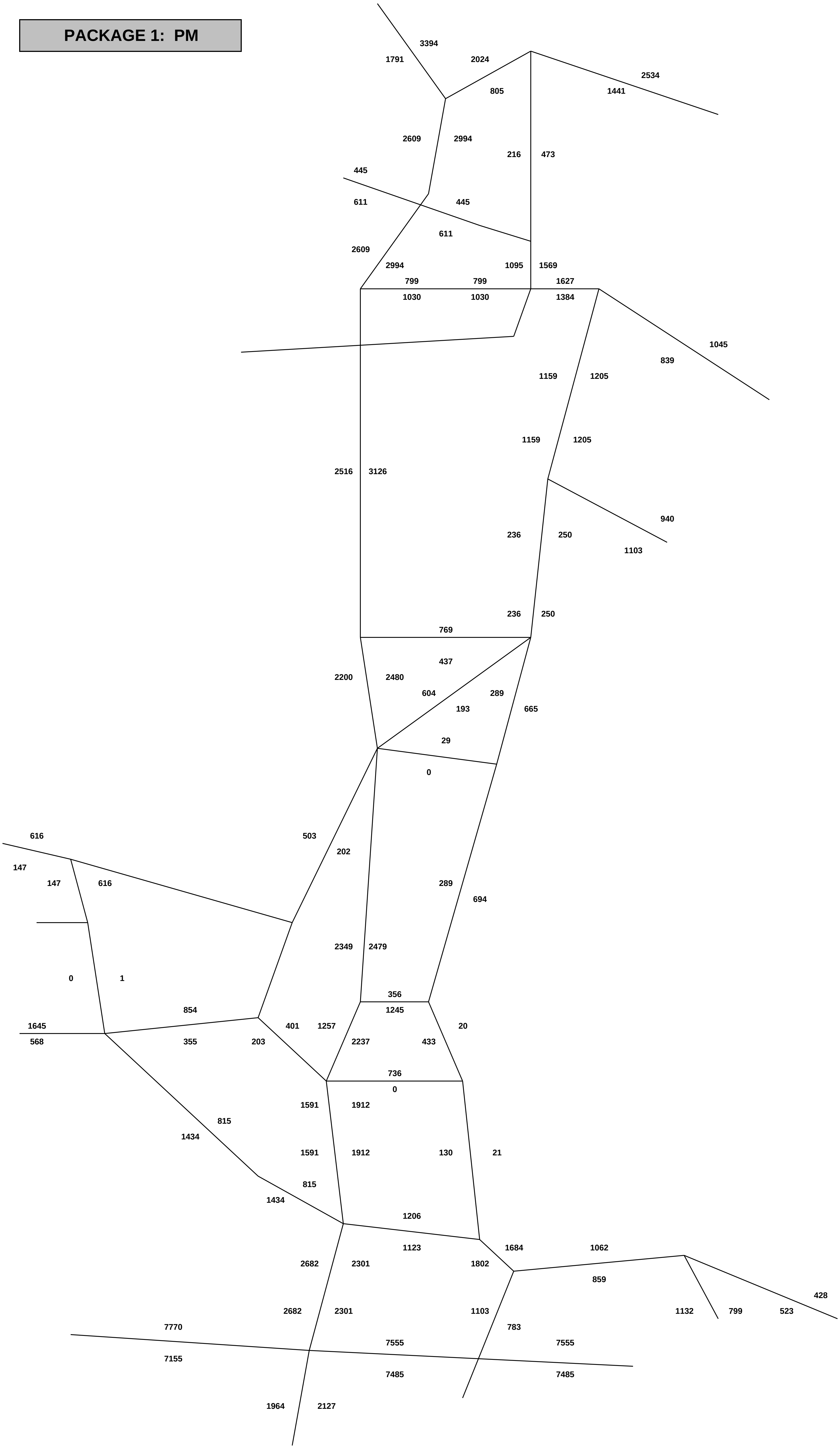
PACKAGE 1: PM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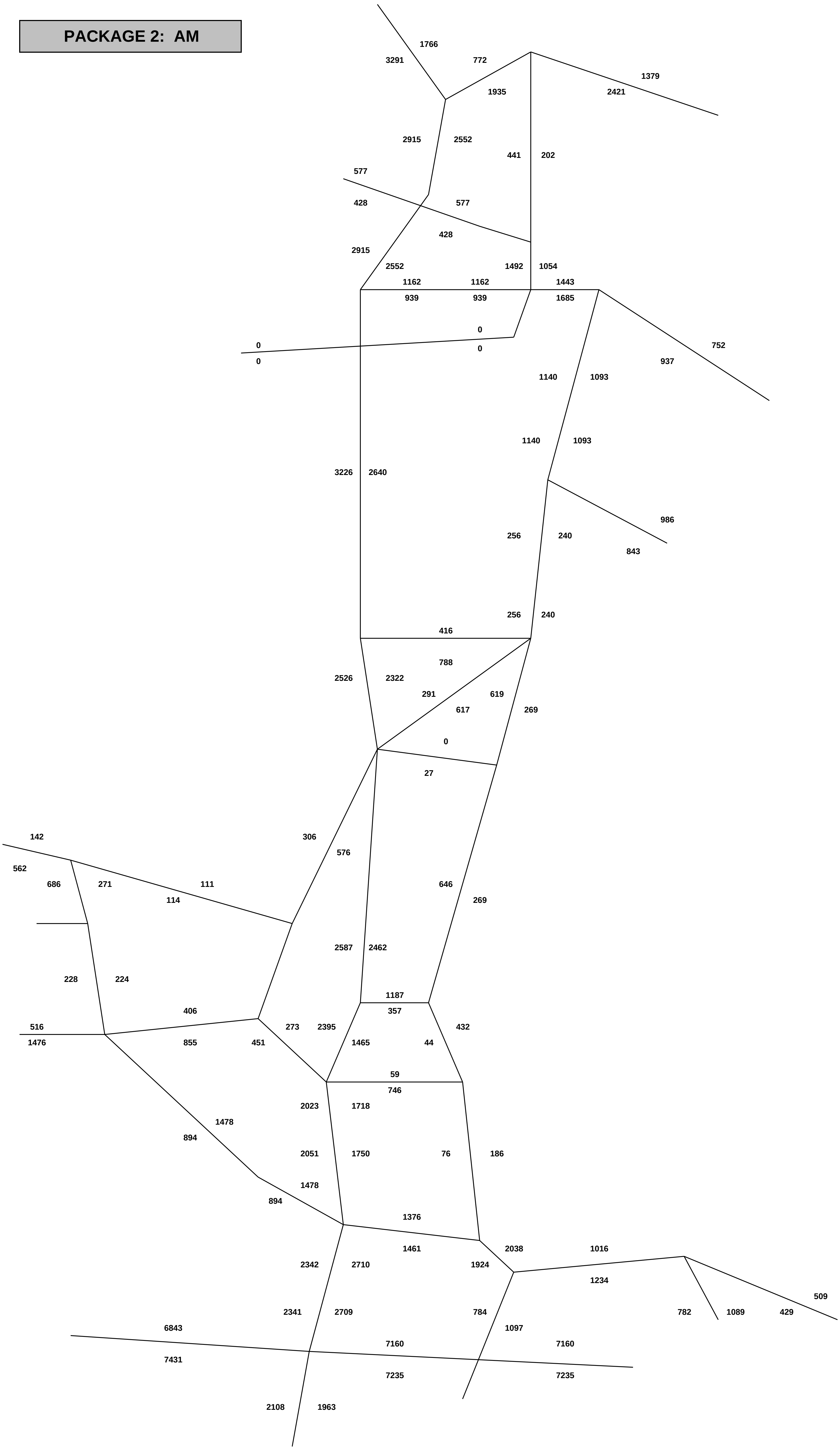

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1162
1162
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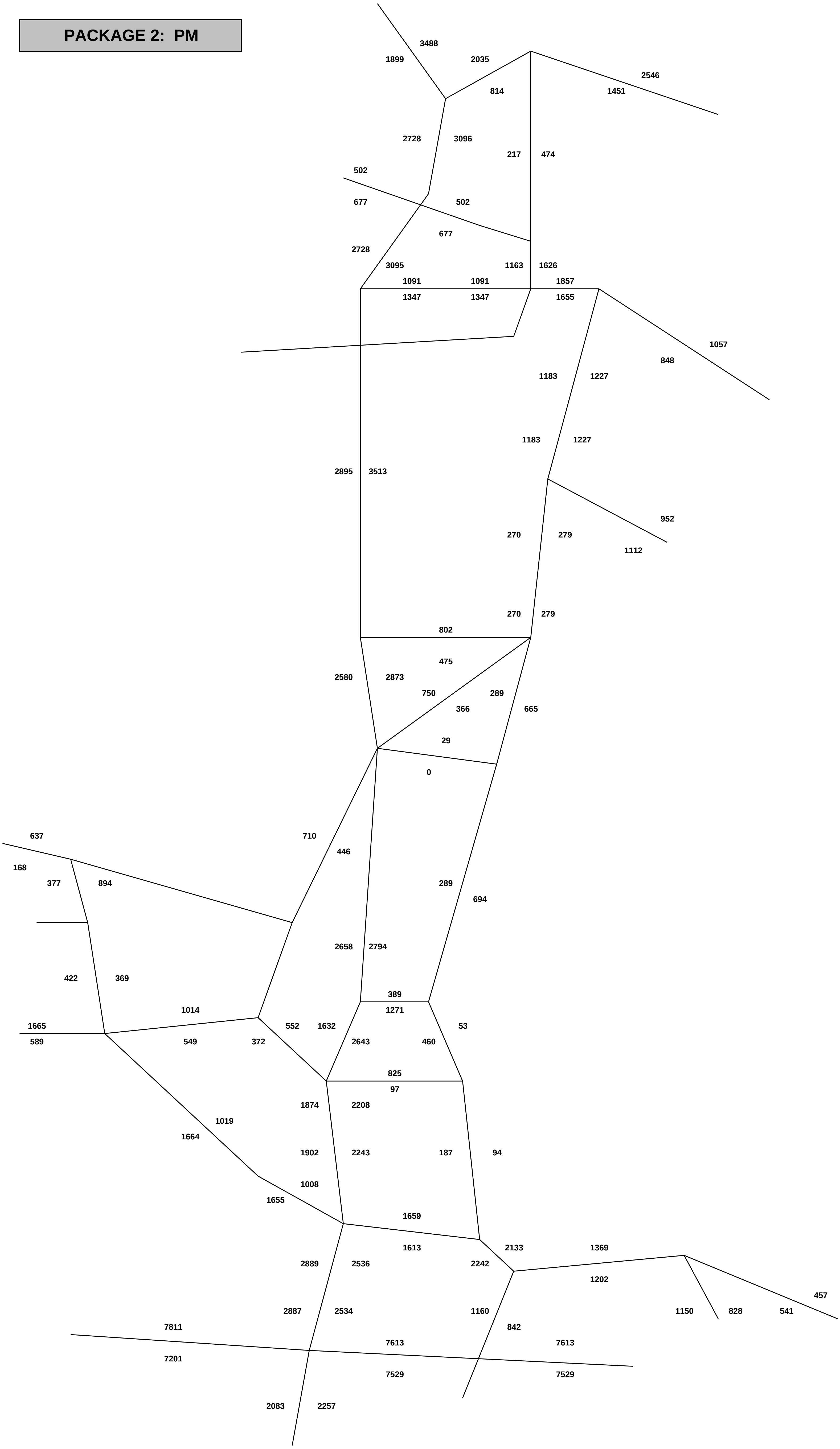
PACKAGE 2: PM



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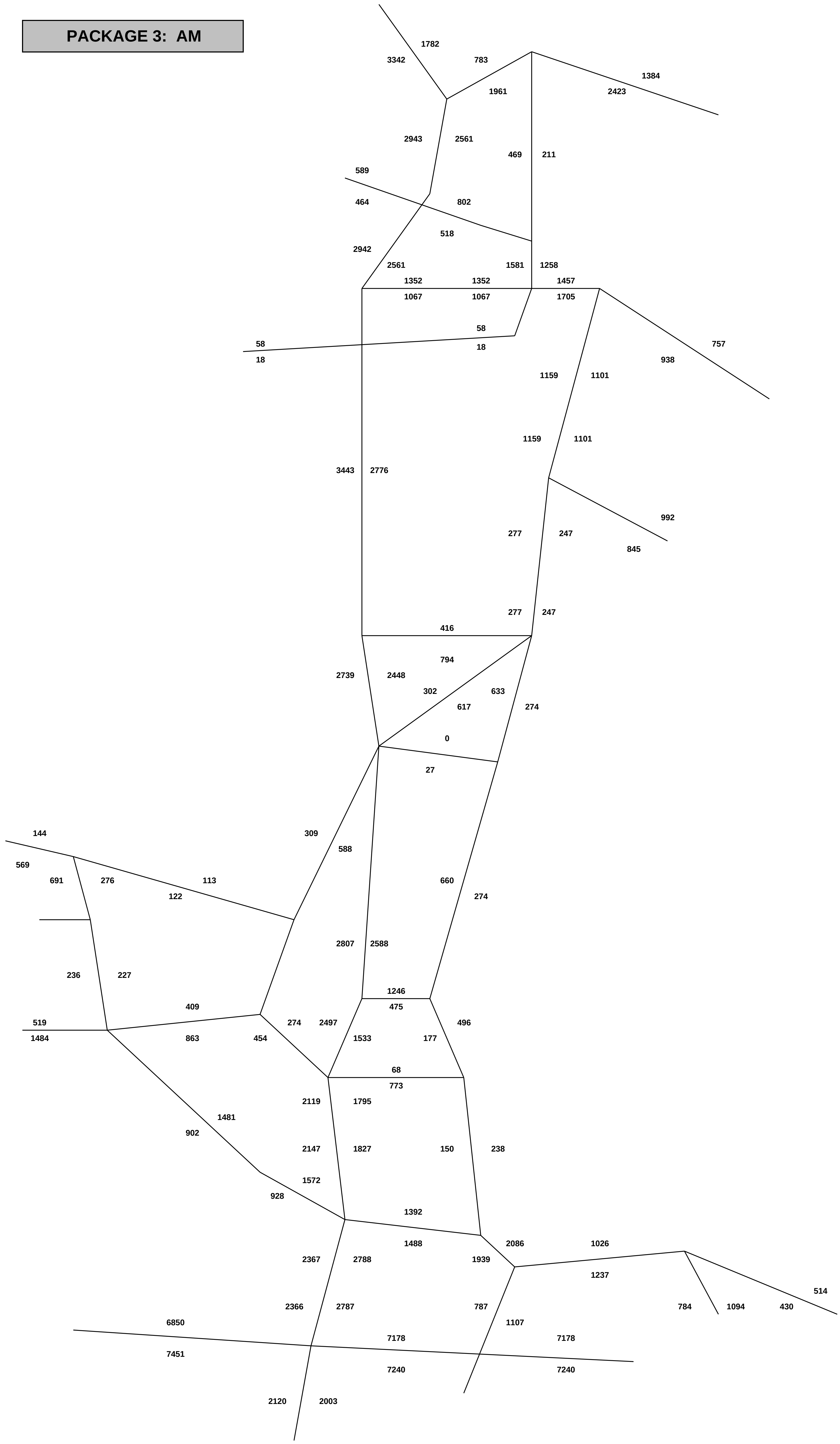
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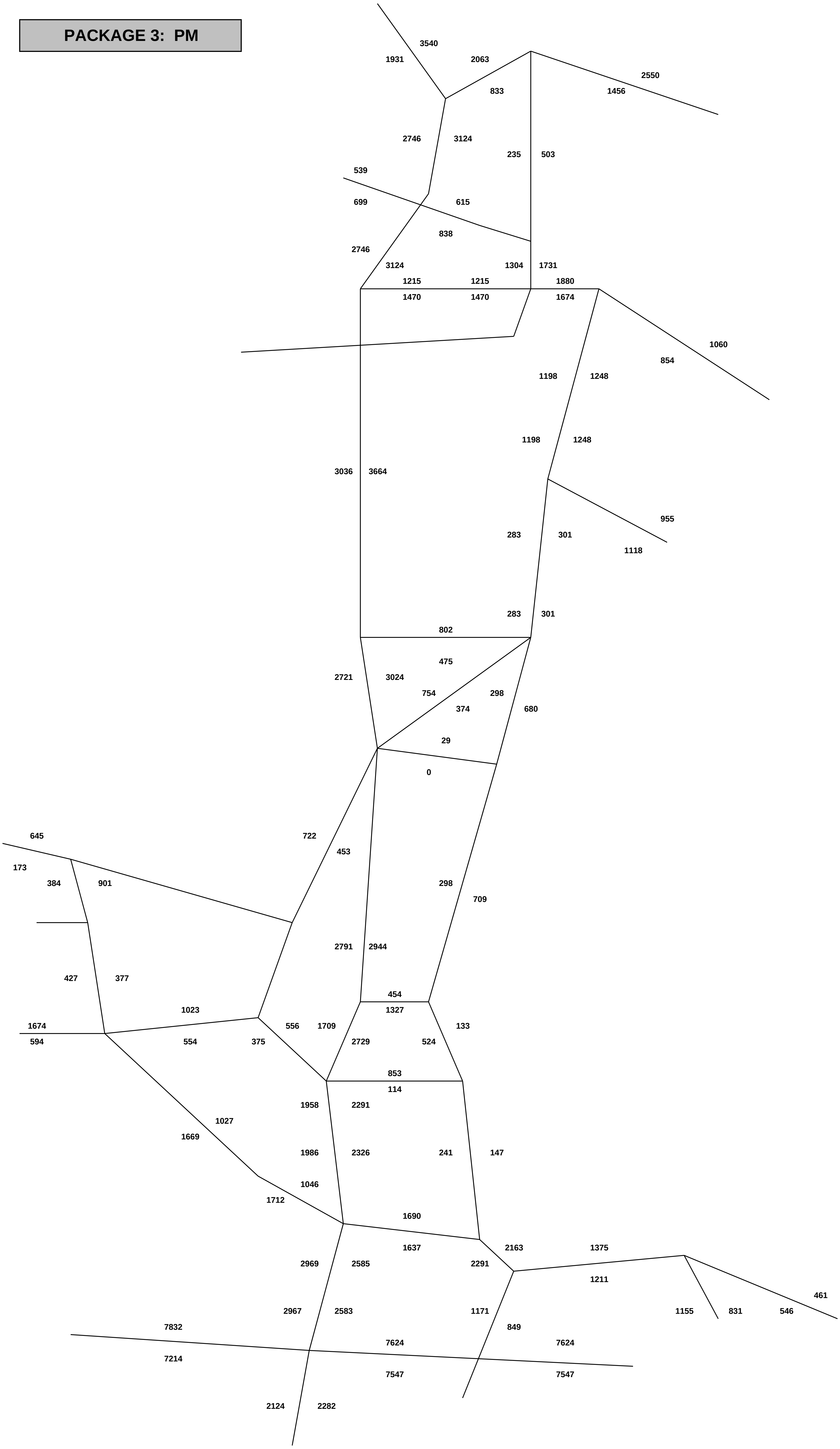
PACKAGE 3: PM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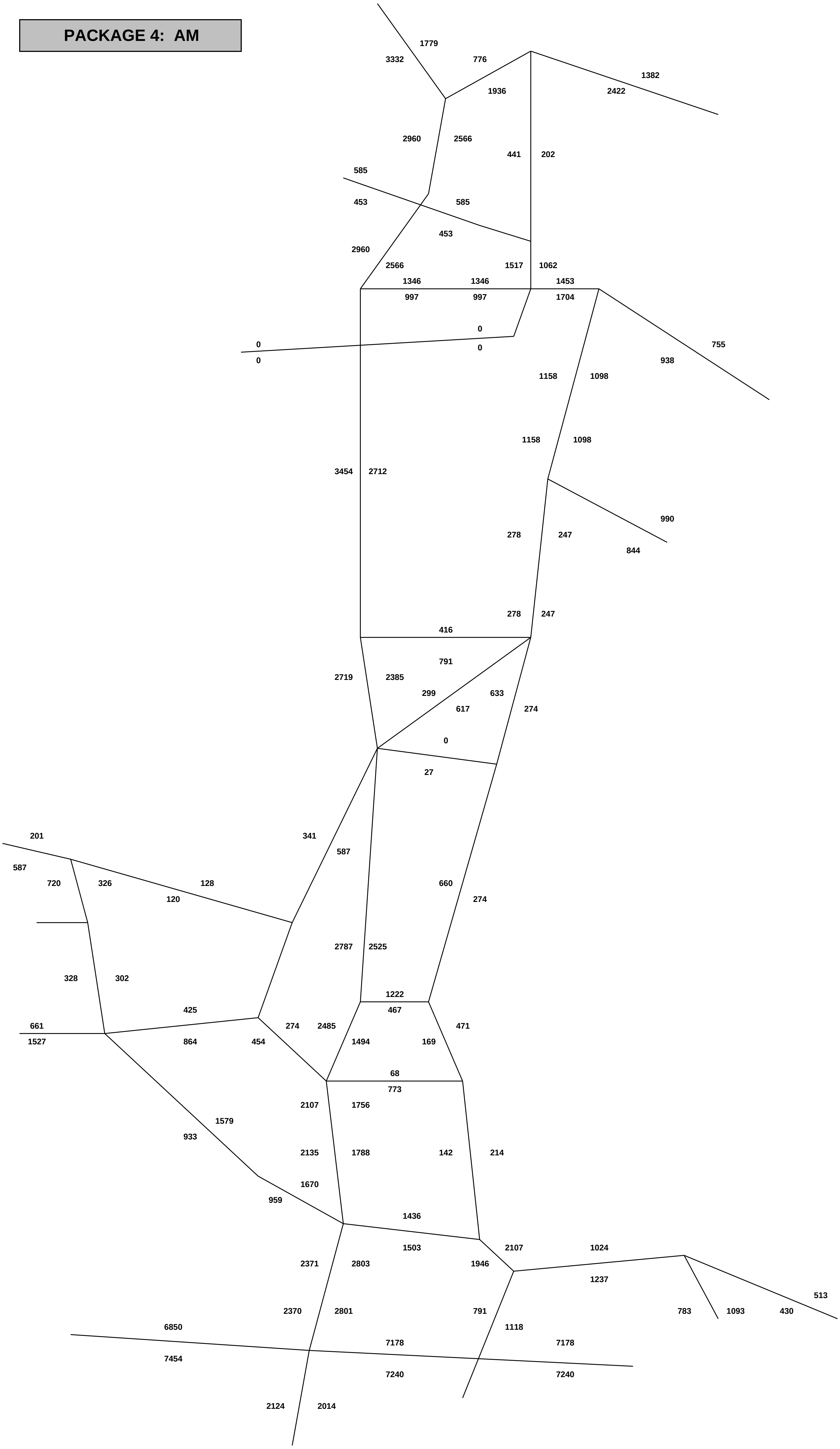
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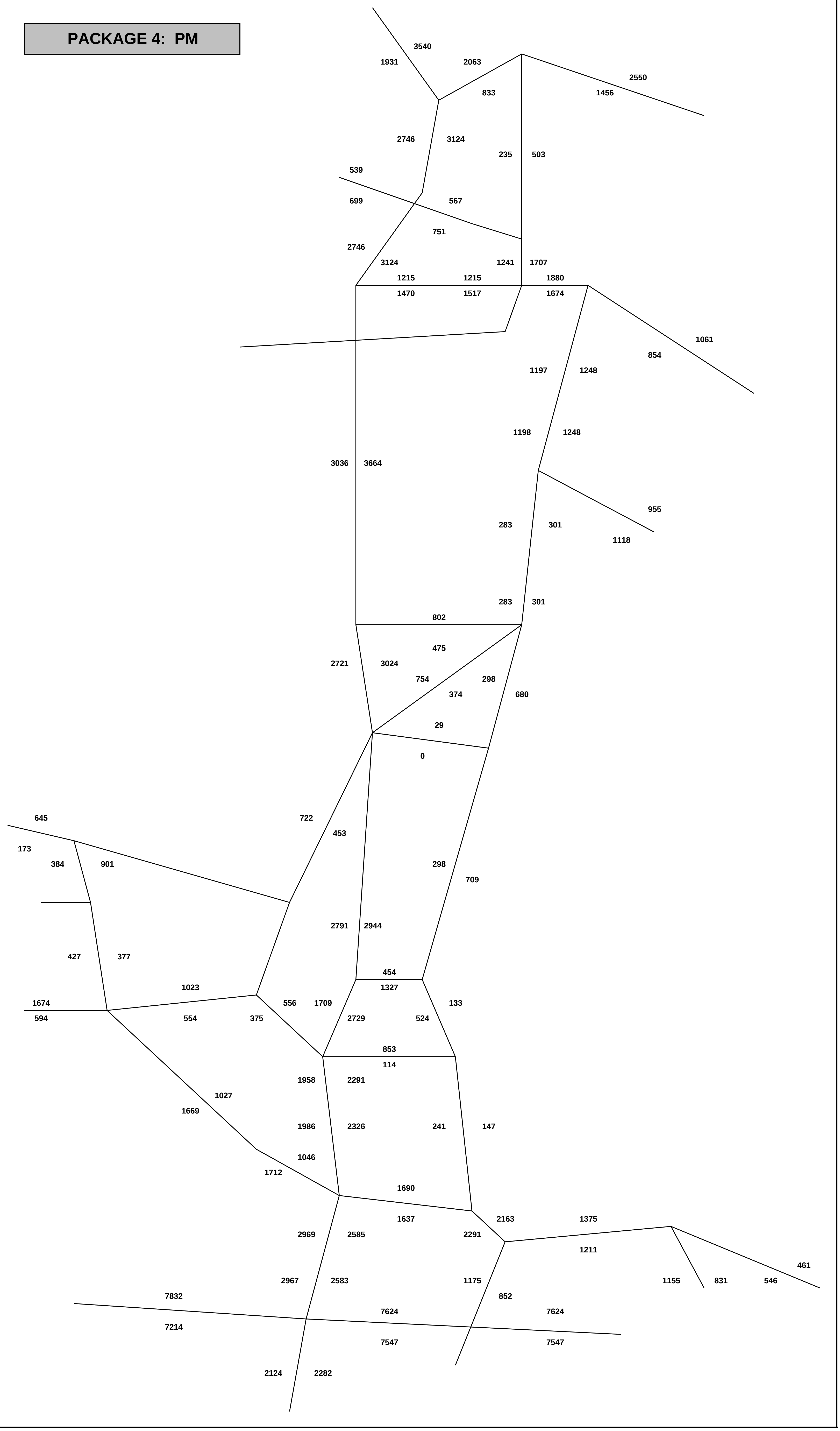
PACKAGE 4: PM



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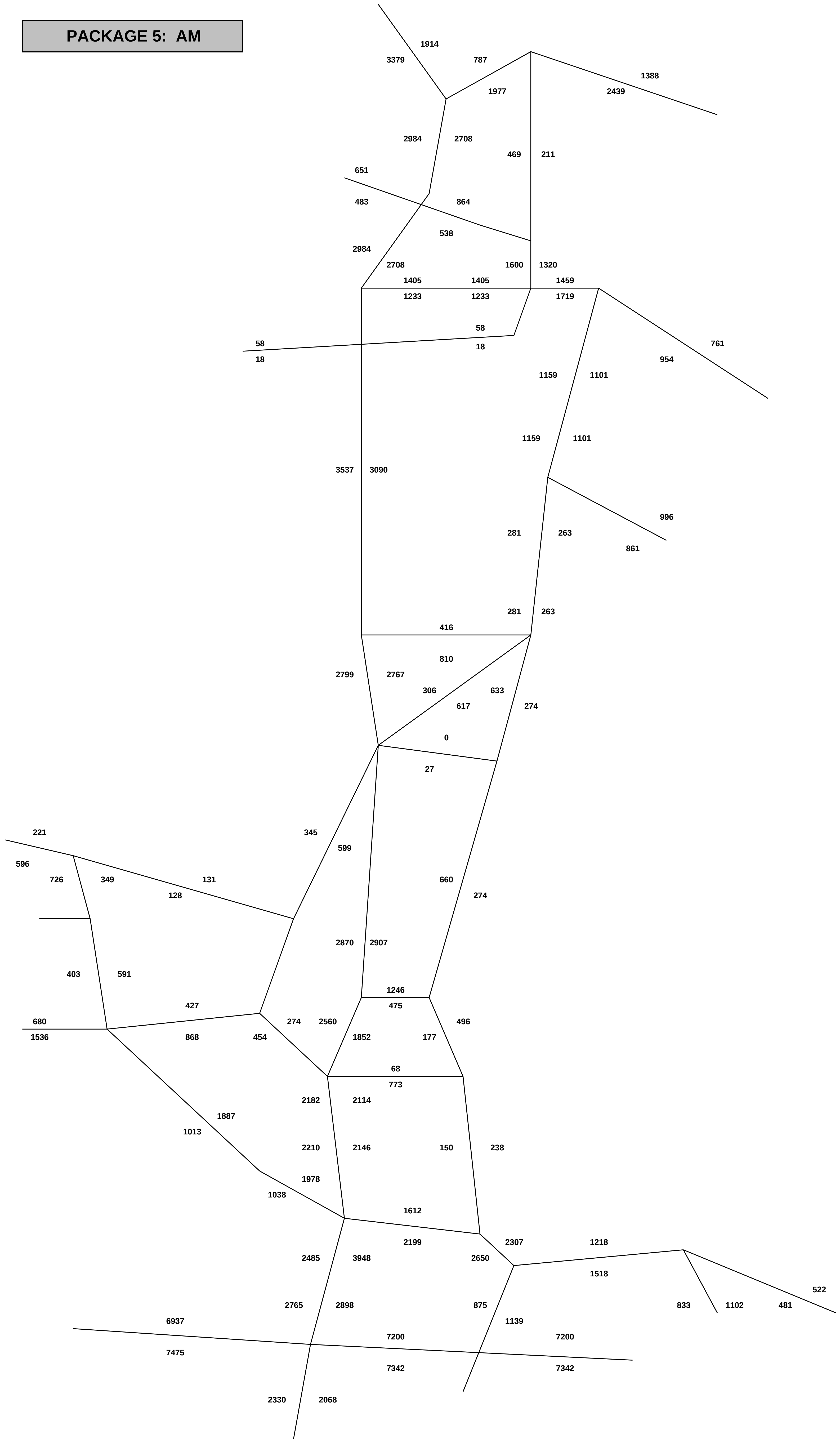
PACKAGE 5: AM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761
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18
954
1159
1101
1159
1101
3537
3090
996
281
263
861
281
263
416
810
2799
2767
306
633
617
274
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221
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726
349
131
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128
274
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2907
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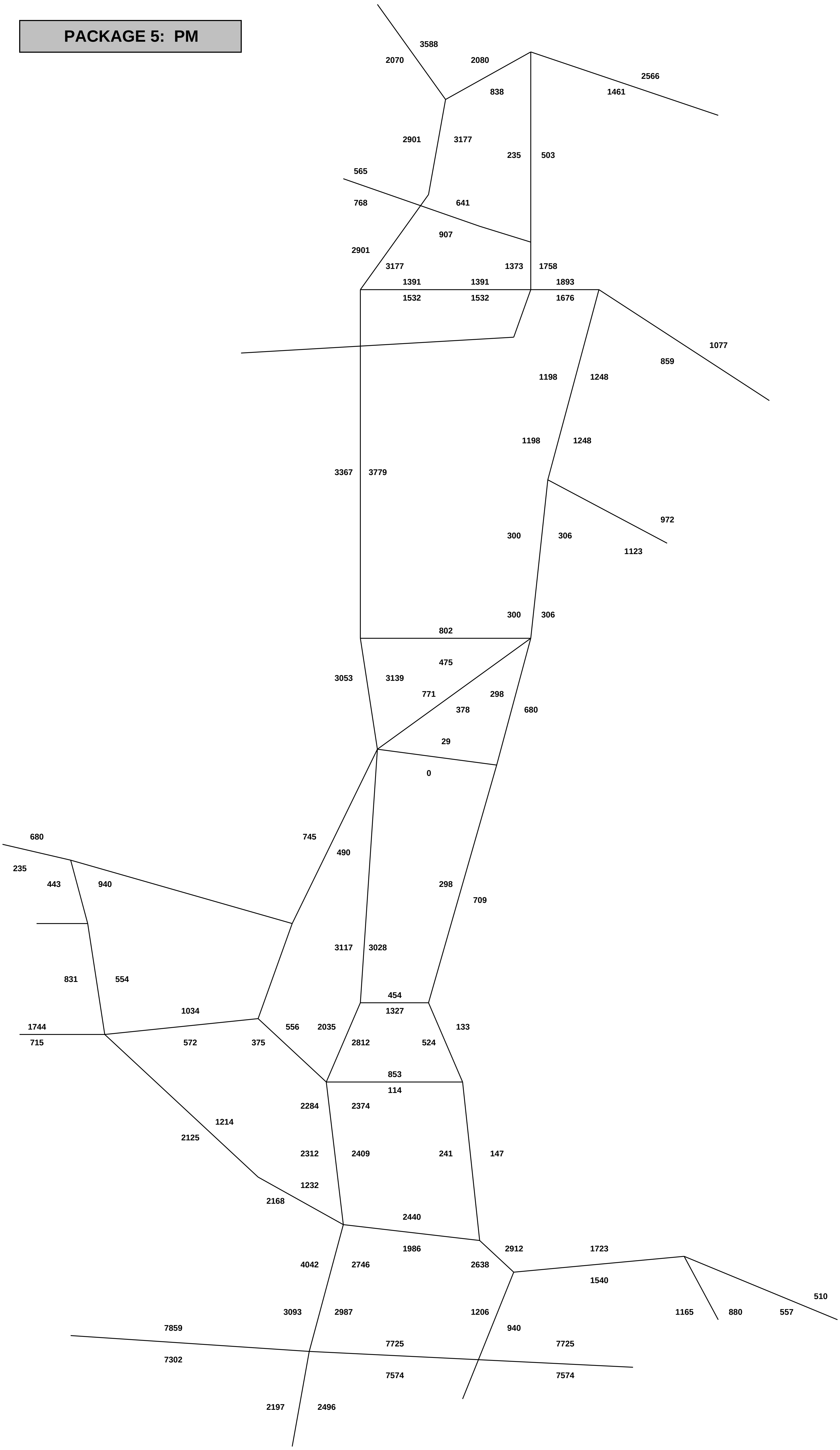
PACKAGE 5: PM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572
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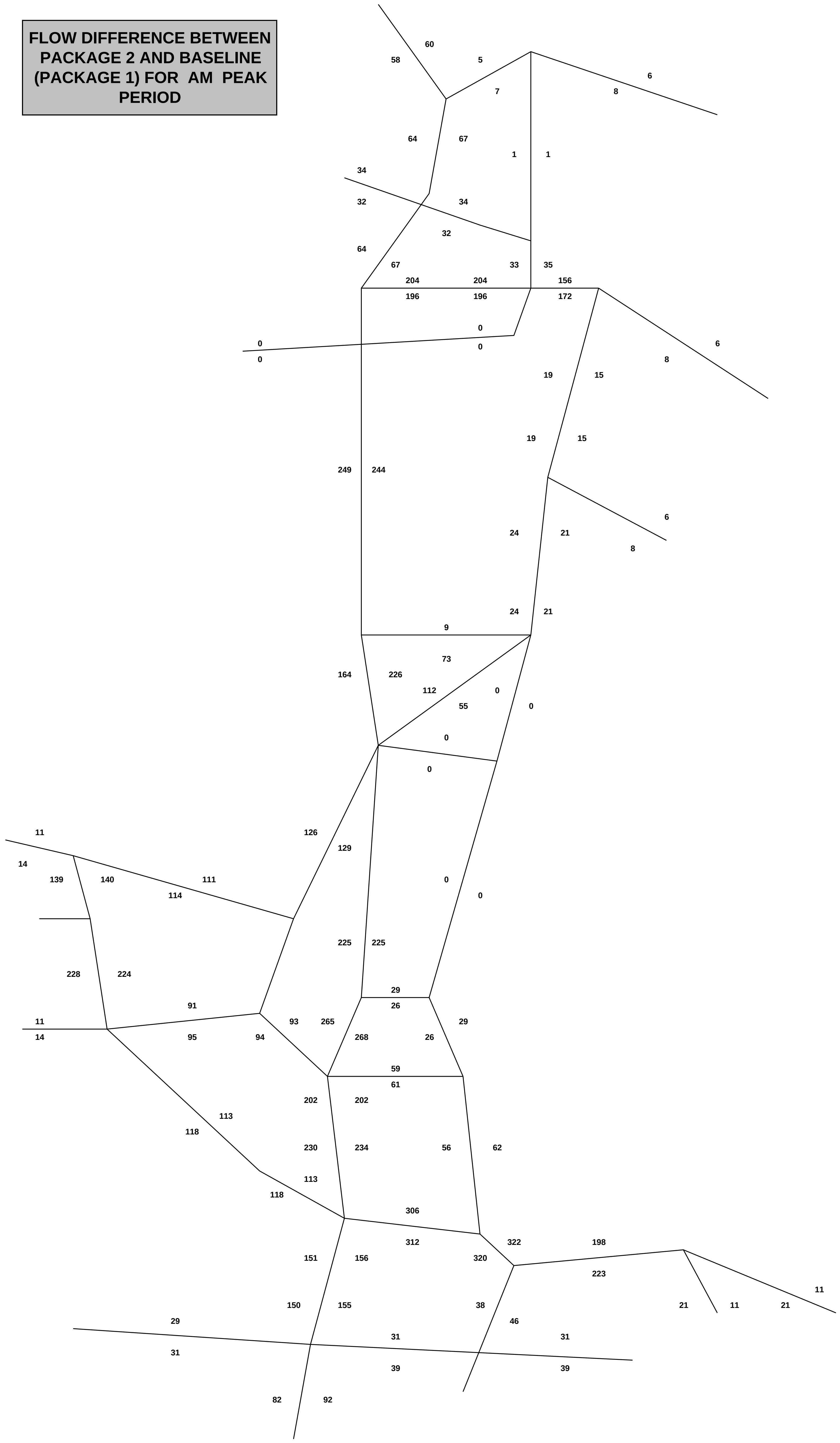
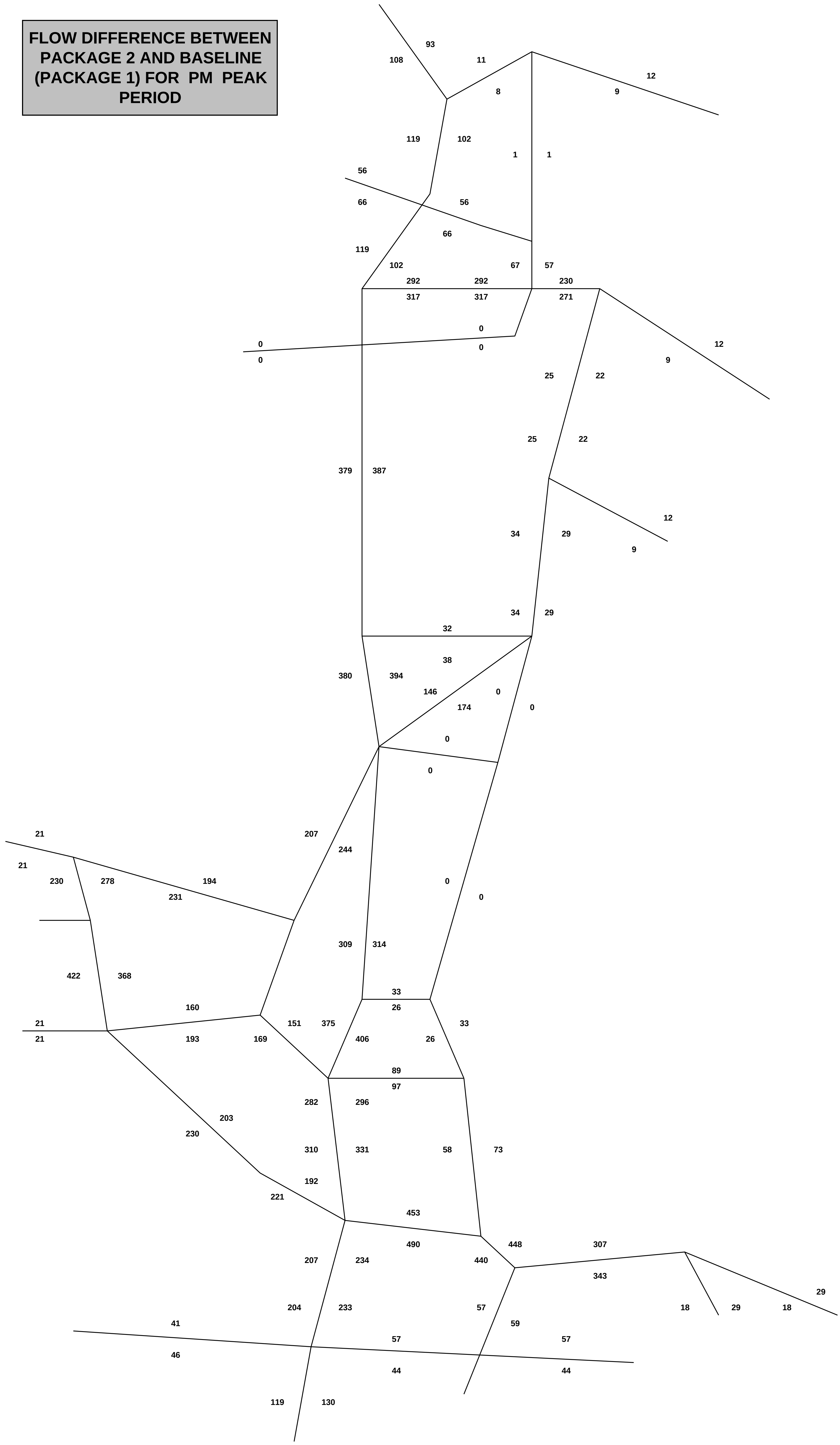
Appendix 11 – Package specific link flow differences

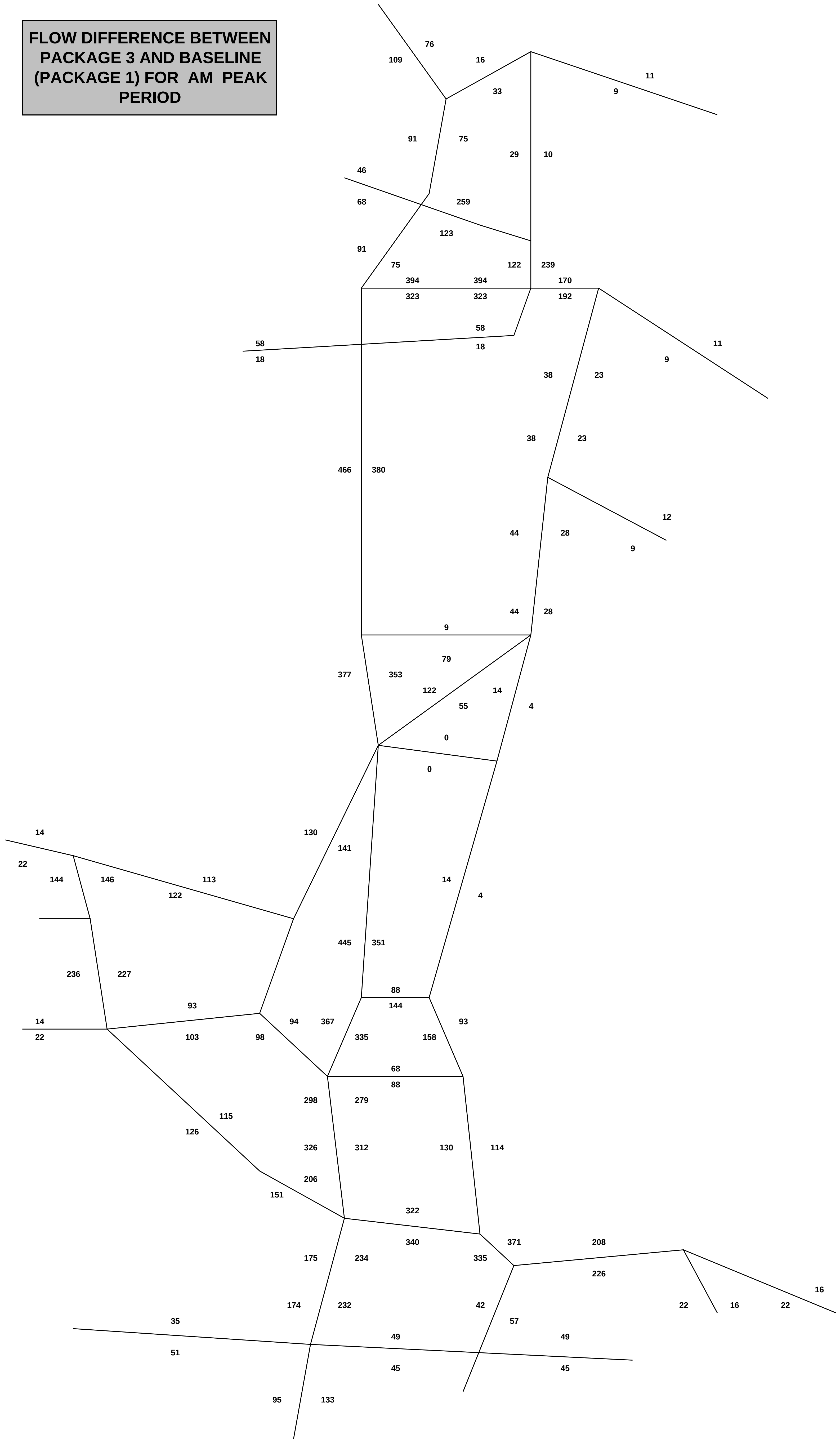
FLOW DIFFERENCE BETWEEN PACKAGE 2 AND BASELINE (PACKAGE 1) FOR AM PEAK PERIOD



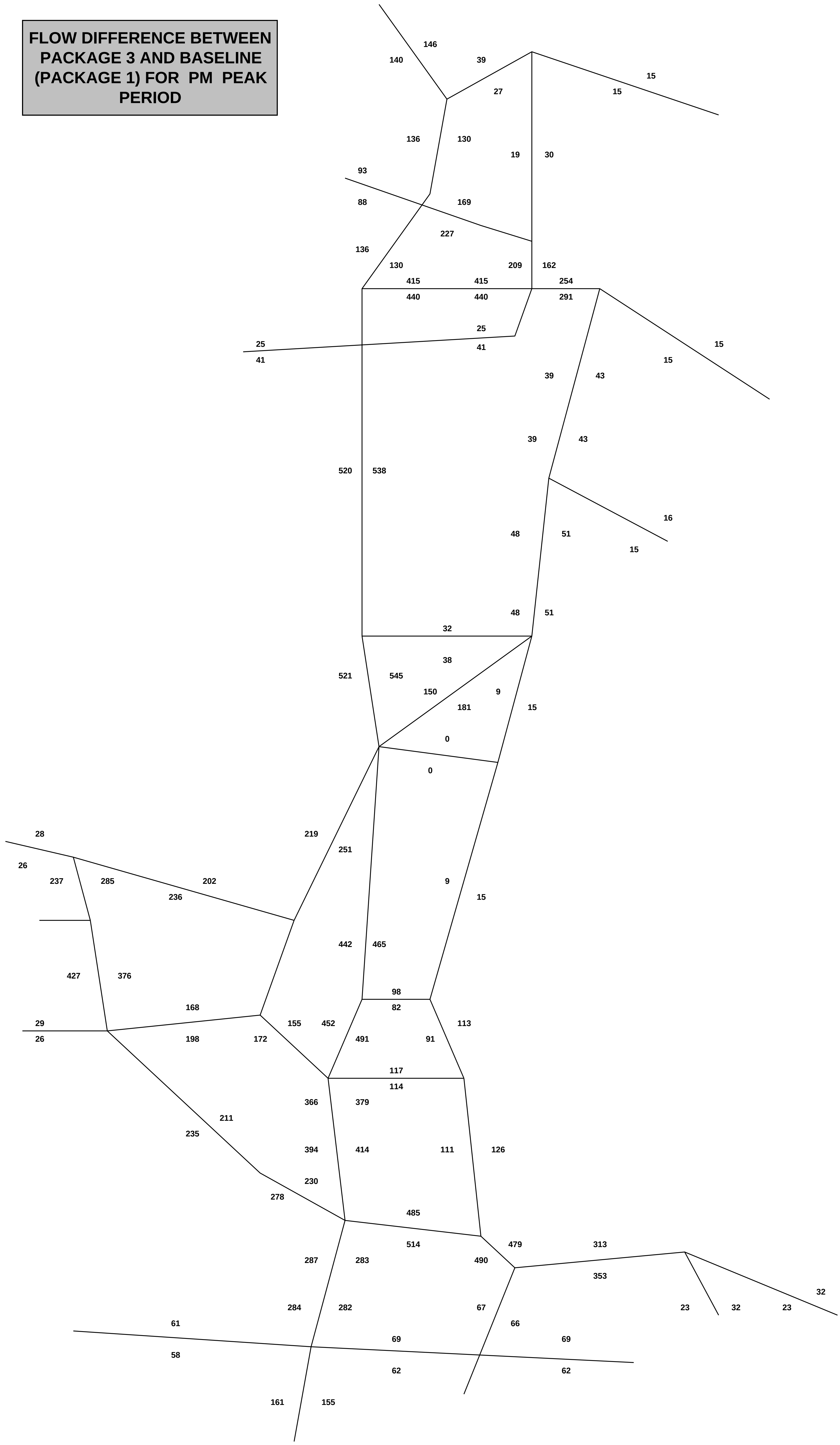
FLOW DIFFERENCE BETWEEN PACKAGE 2 AND BASELINE (PACKAGE 1) FOR PM PEAK PERIOD



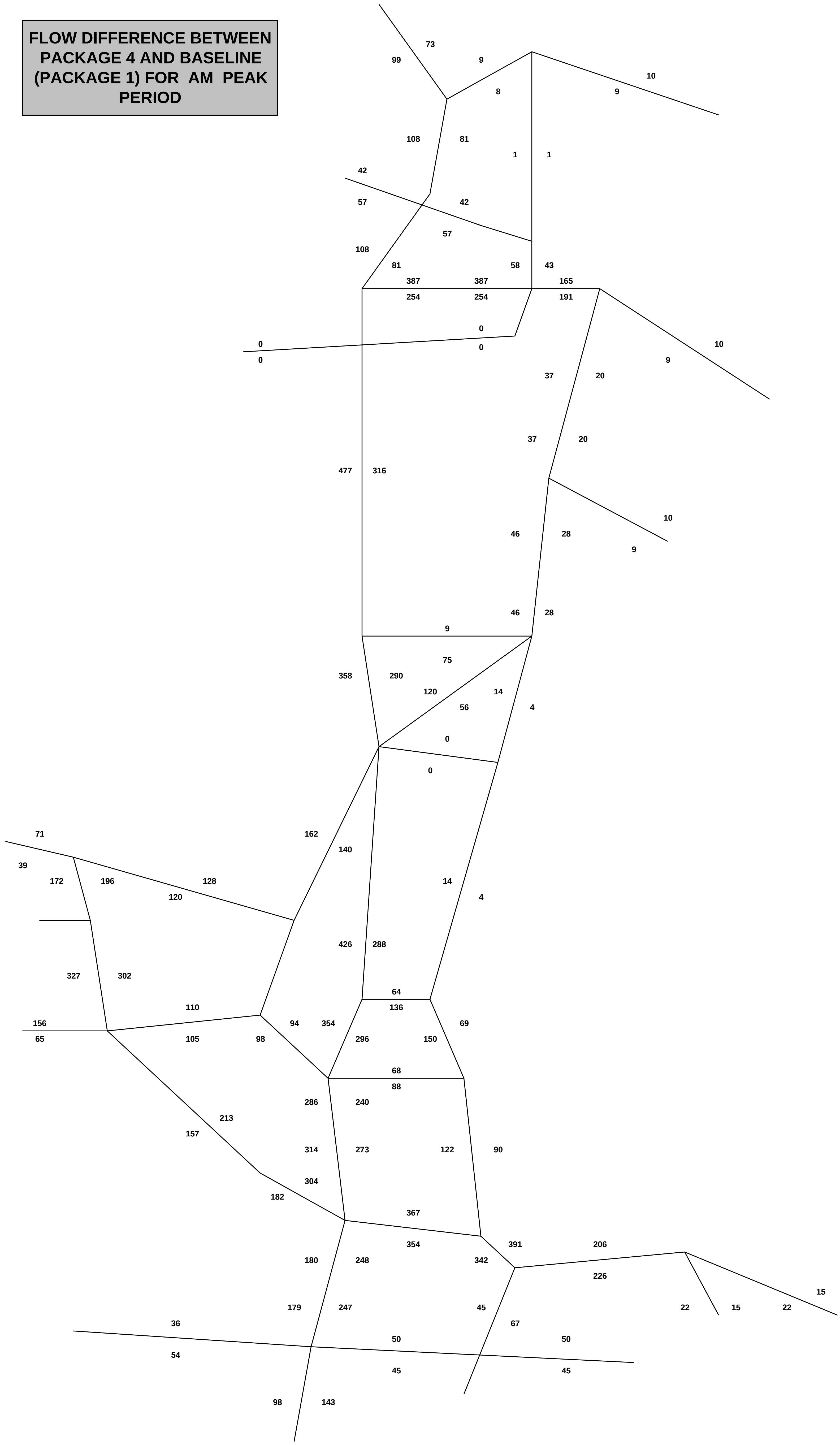
FLOW DIFFERENCE BETWEEN PACKAGE 3 AND BASELINE (PACKAGE 1) FOR AM PEAK PERIOD



FLOW DIFFERENCE BETWEEN PACKAGE 3 AND BASELINE (PACKAGE 1) FOR PM PEAK PERIOD



FLOW DIFFERENCE BETWEEN PACKAGE 4 AND BASELINE (PACKAGE 1) FOR AM PEAK PERIOD



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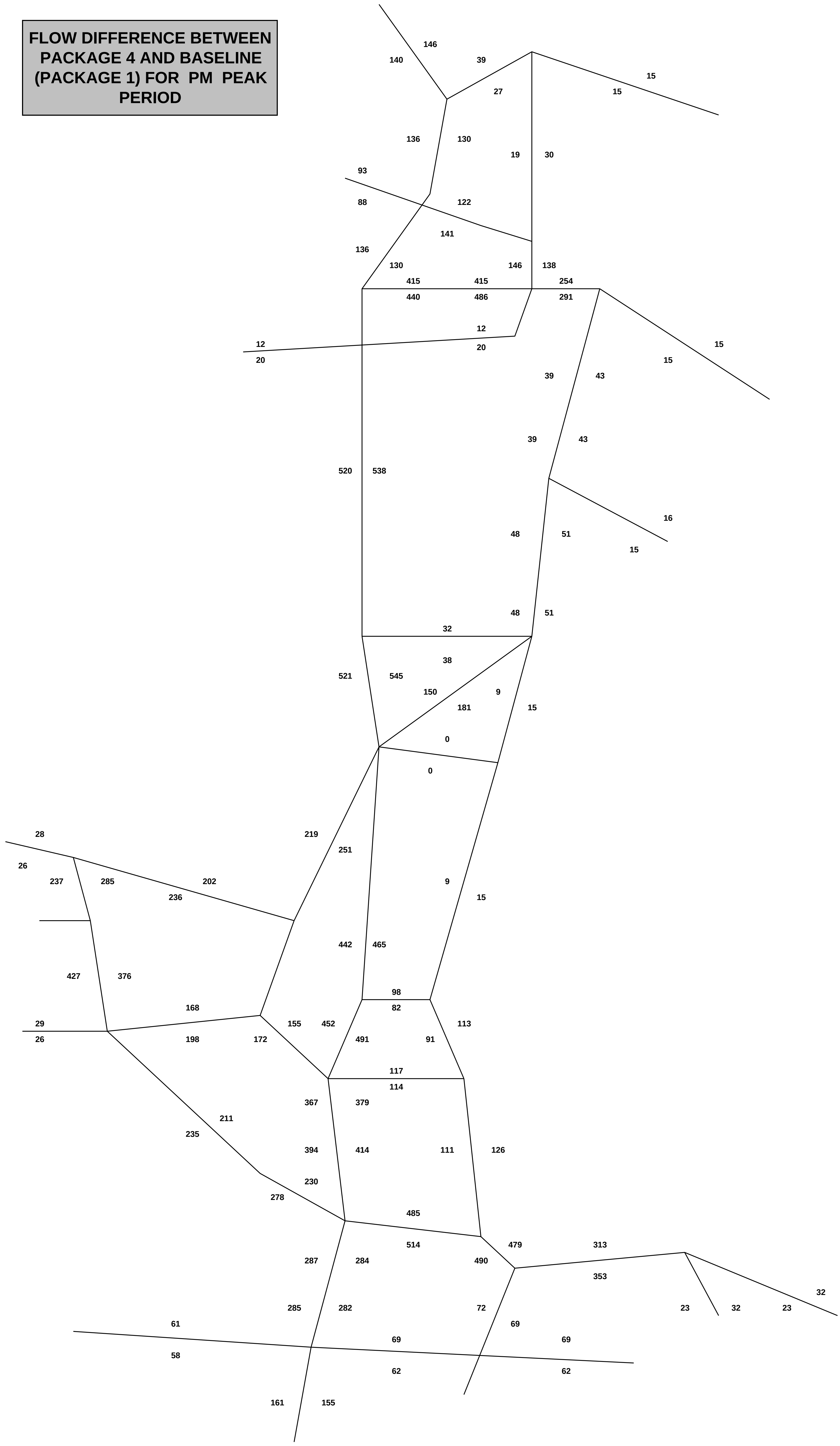
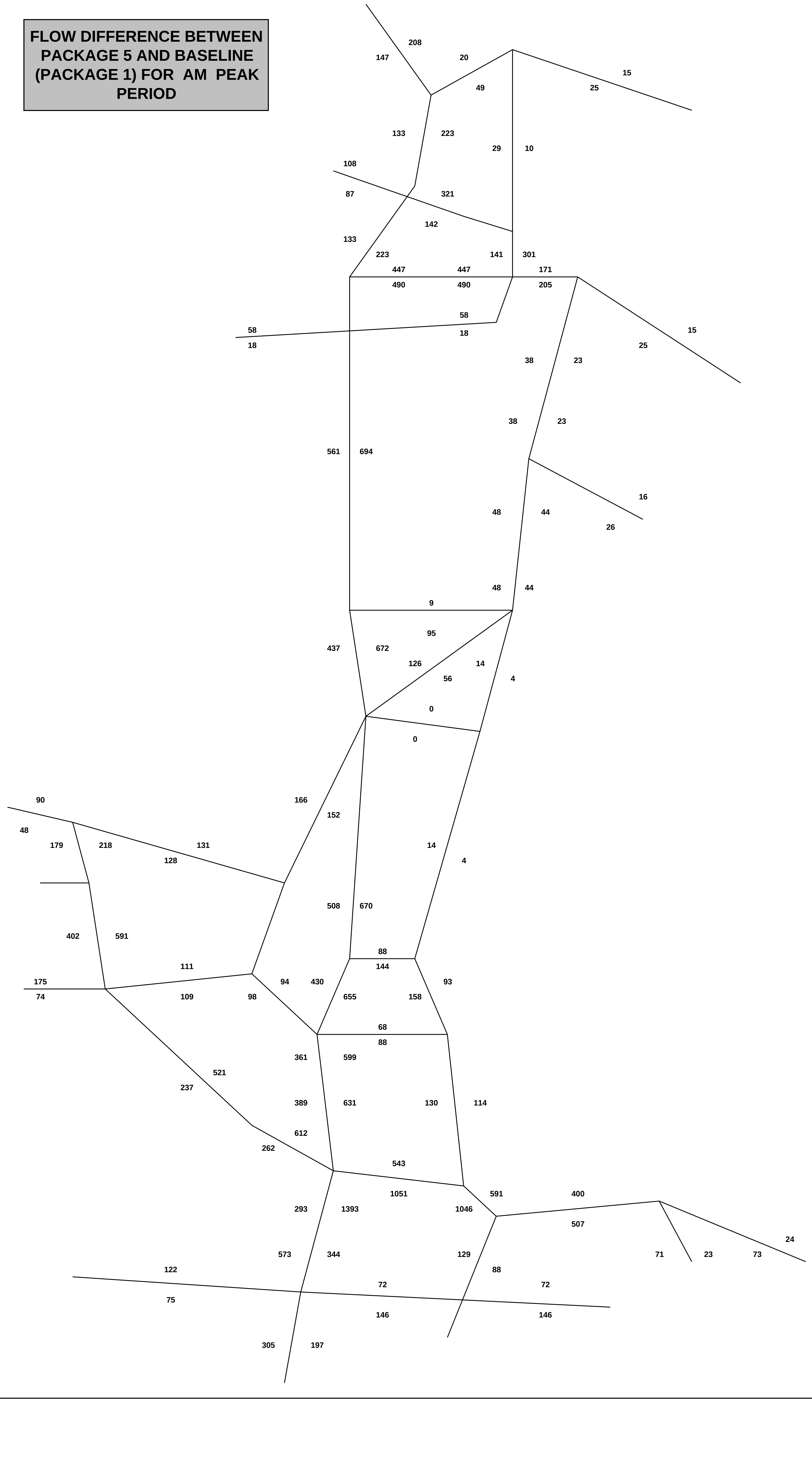
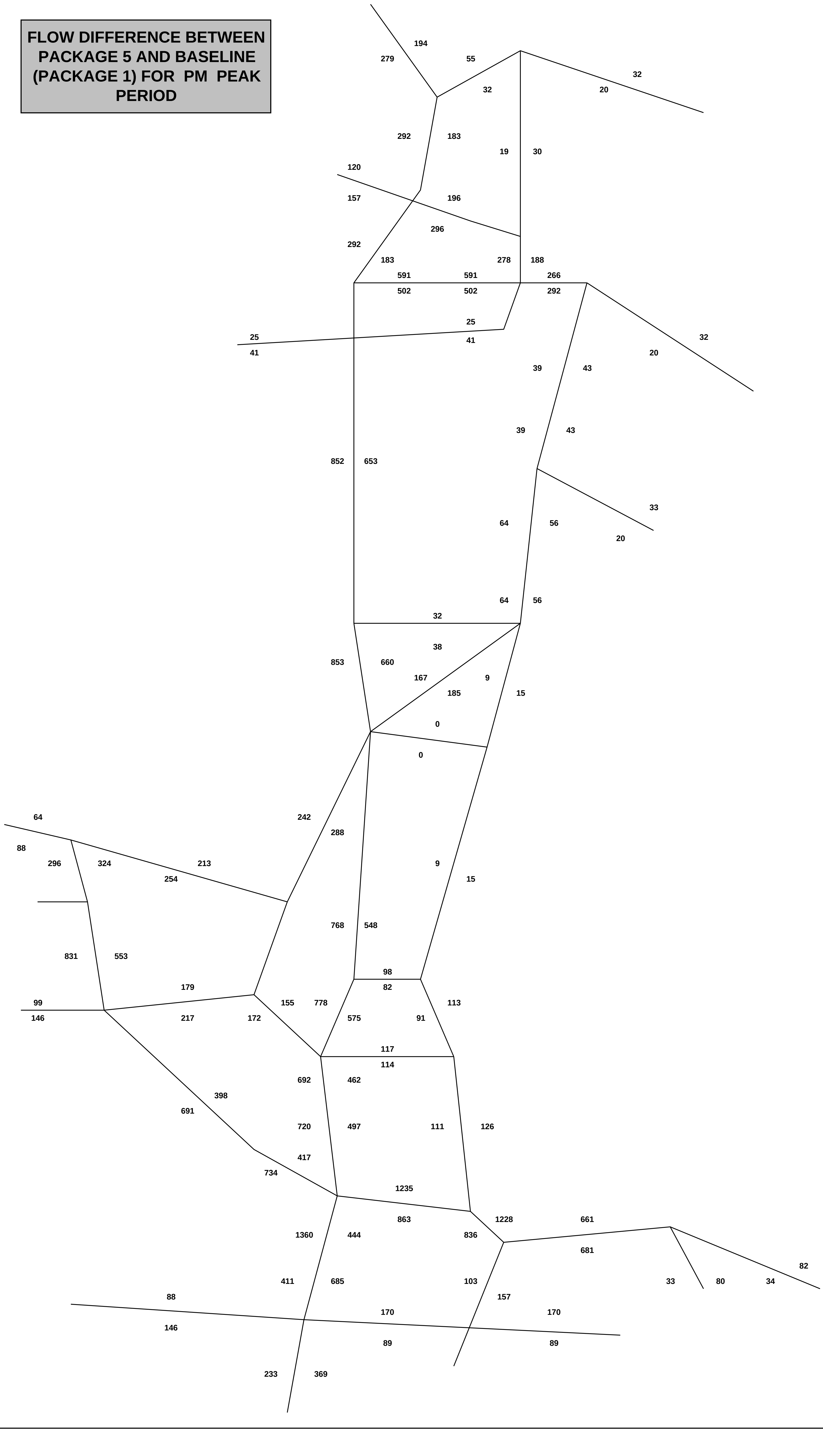


FLOW DIFFERENCE BETWEEN PACKAGE 5 AND BASELINE (PACKAGE 1) FOR AM PEAK PERIOD

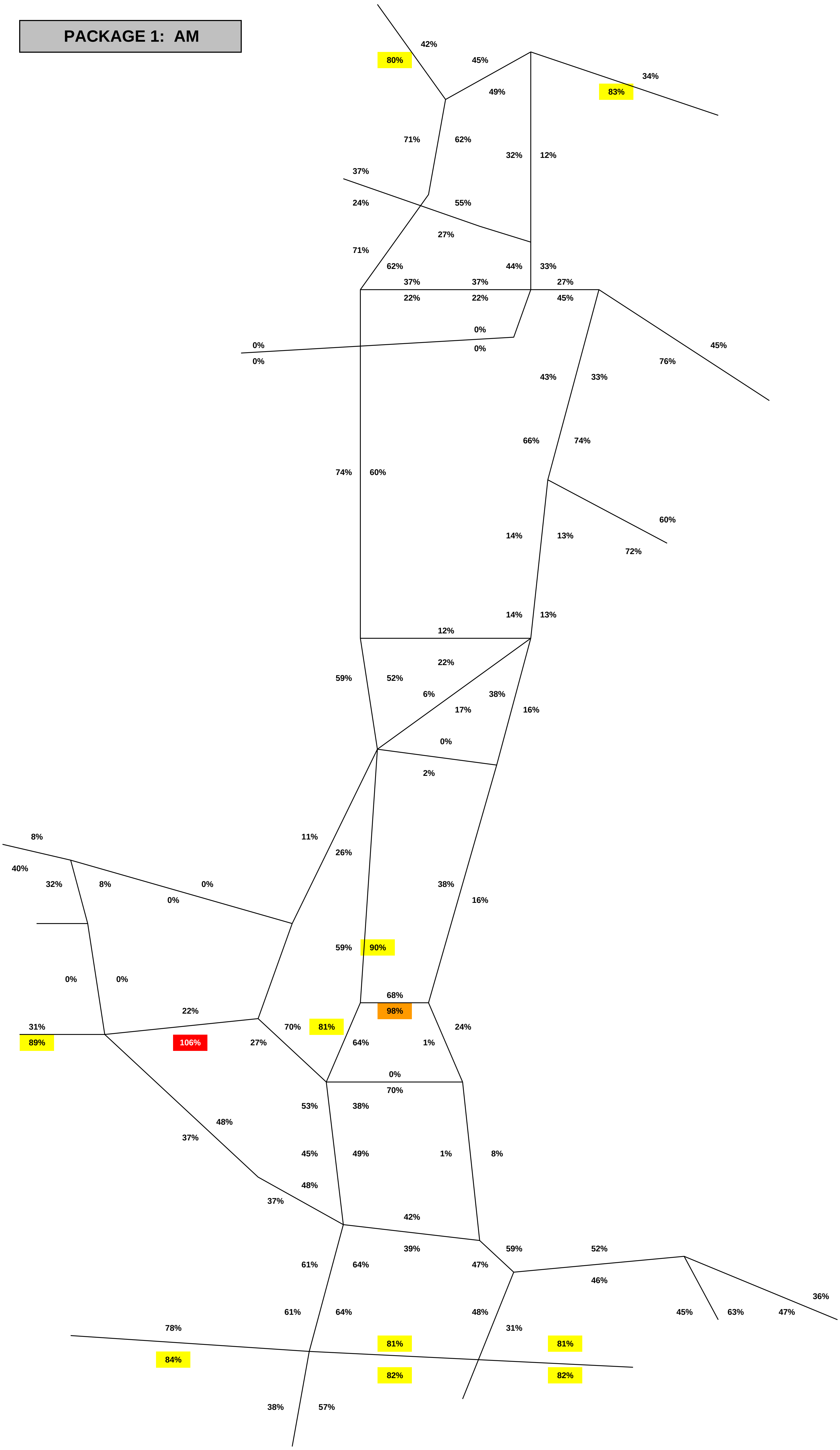


FLOW DIFFERENCE BETWEEN PACKAGE 5 AND BASELINE (PACKAGE 1) FOR PM PEAK PERIOD



Appendix 12a – Package specific link V/C %

PACKAGE 1: AM



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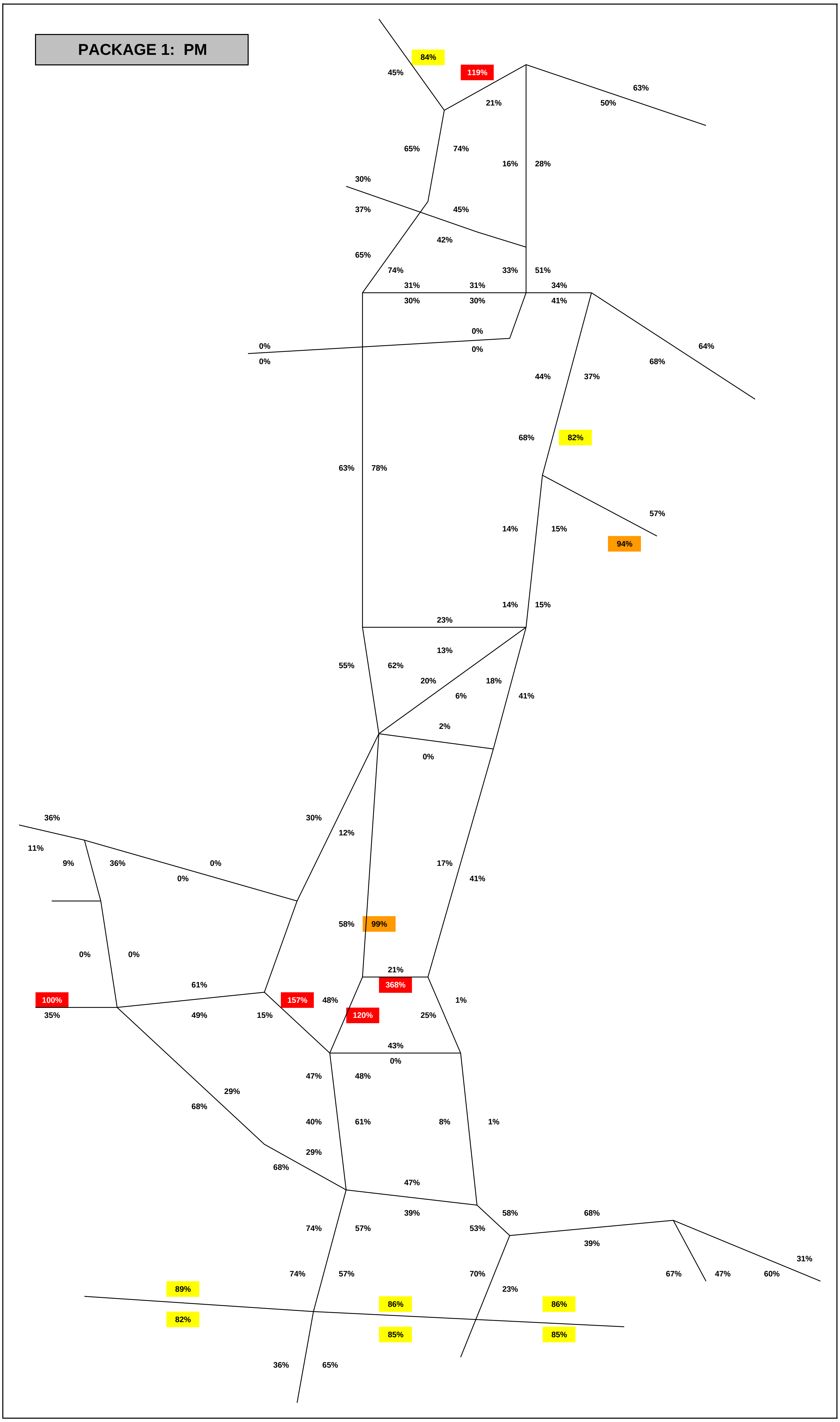
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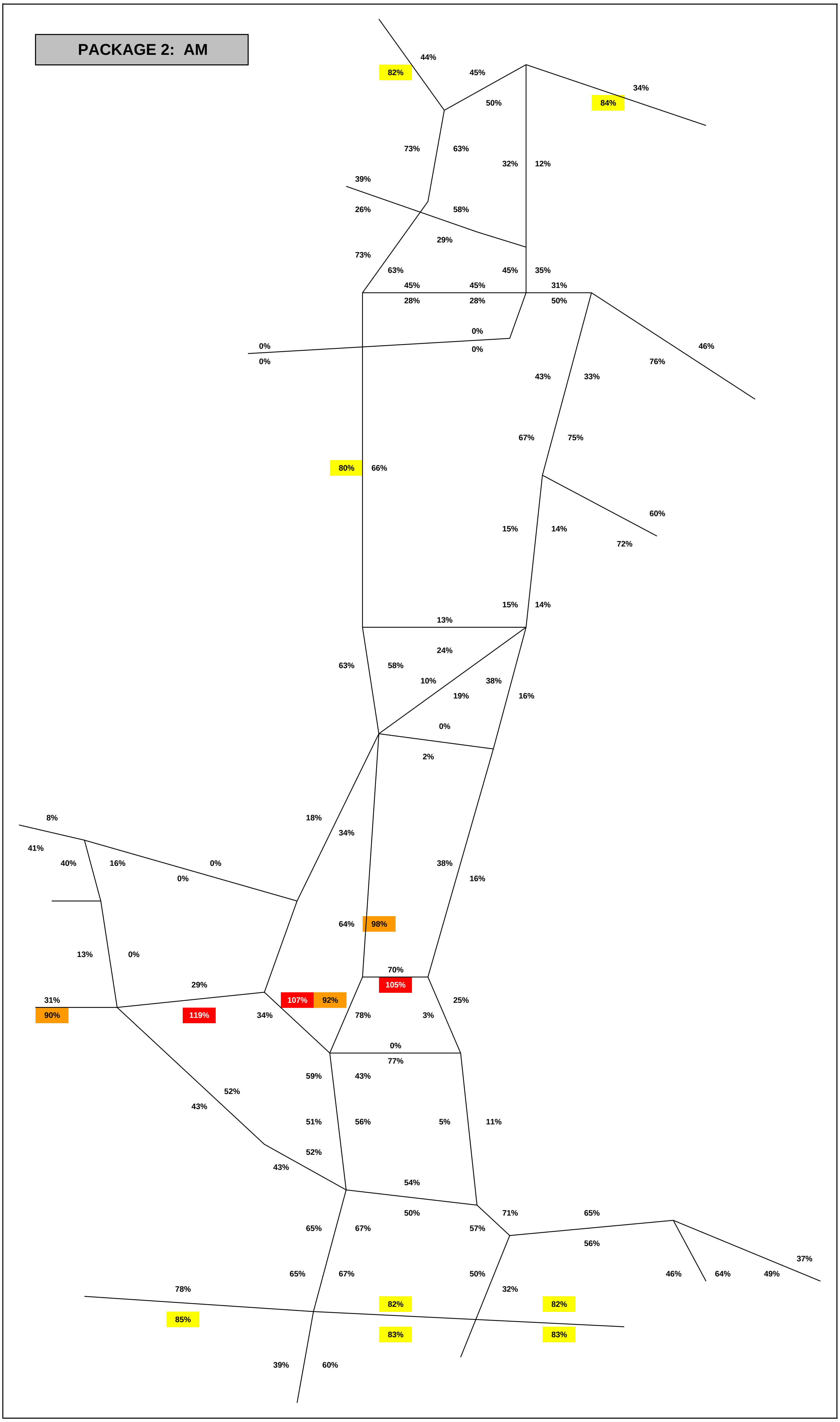
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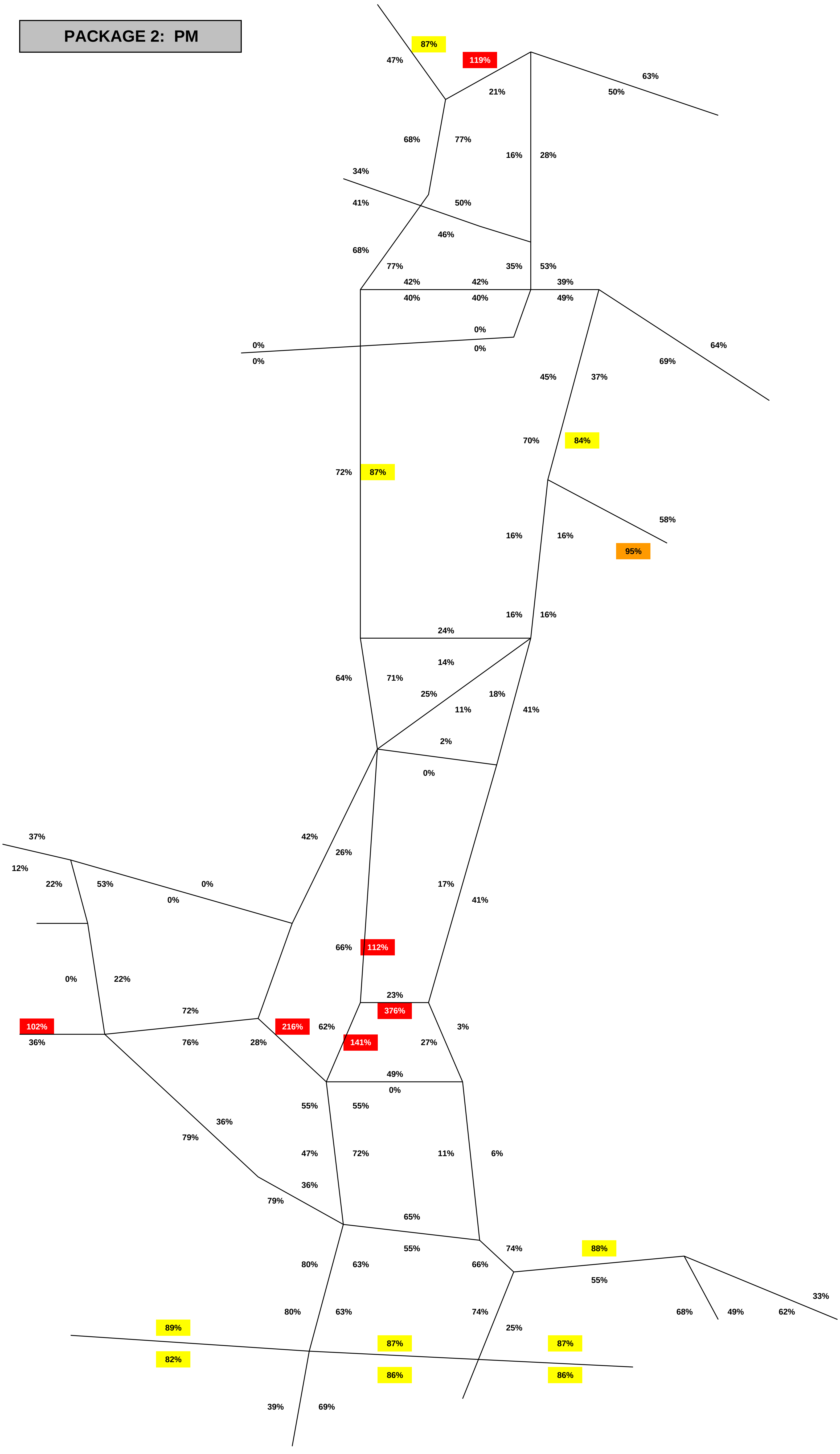

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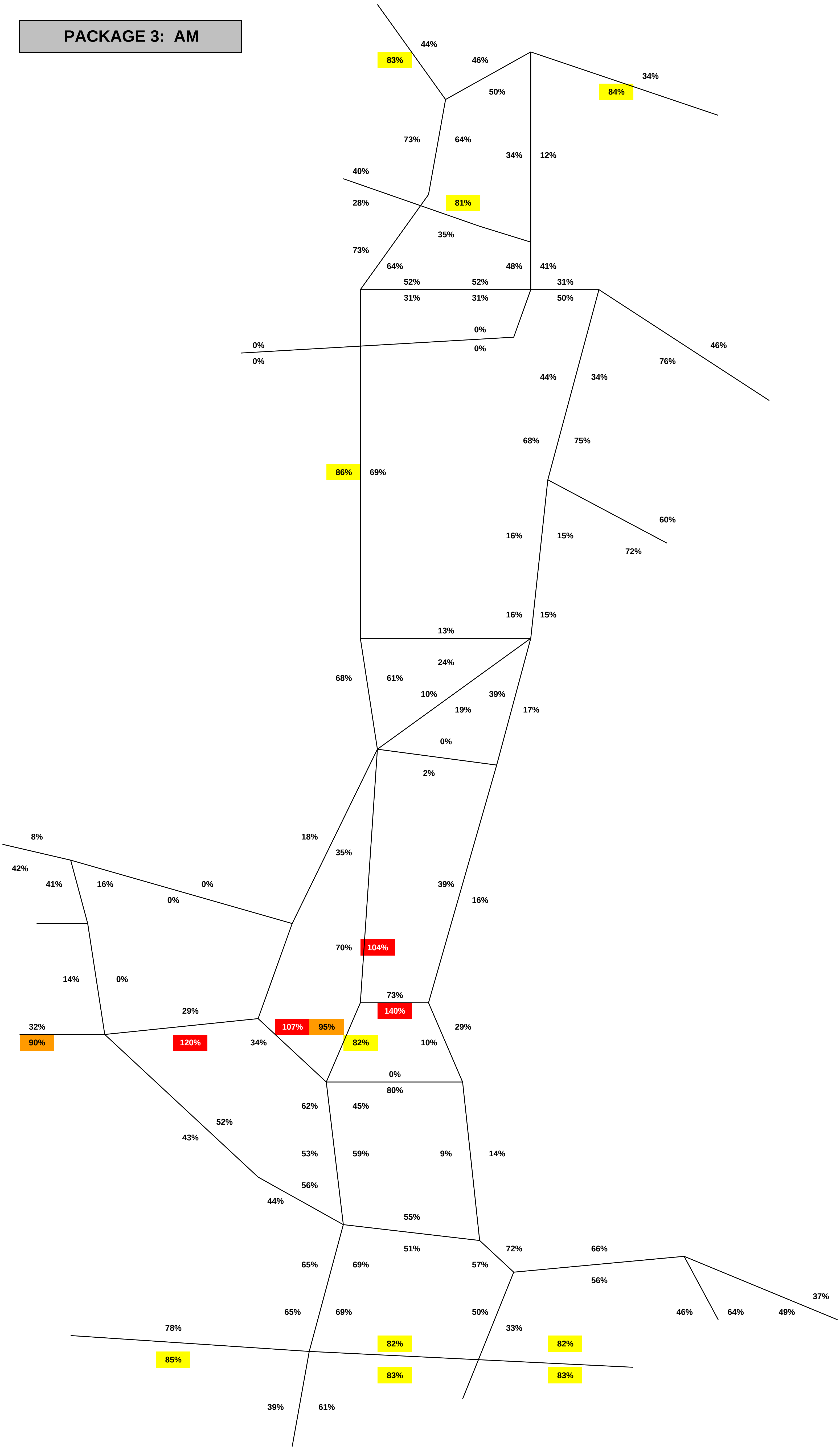

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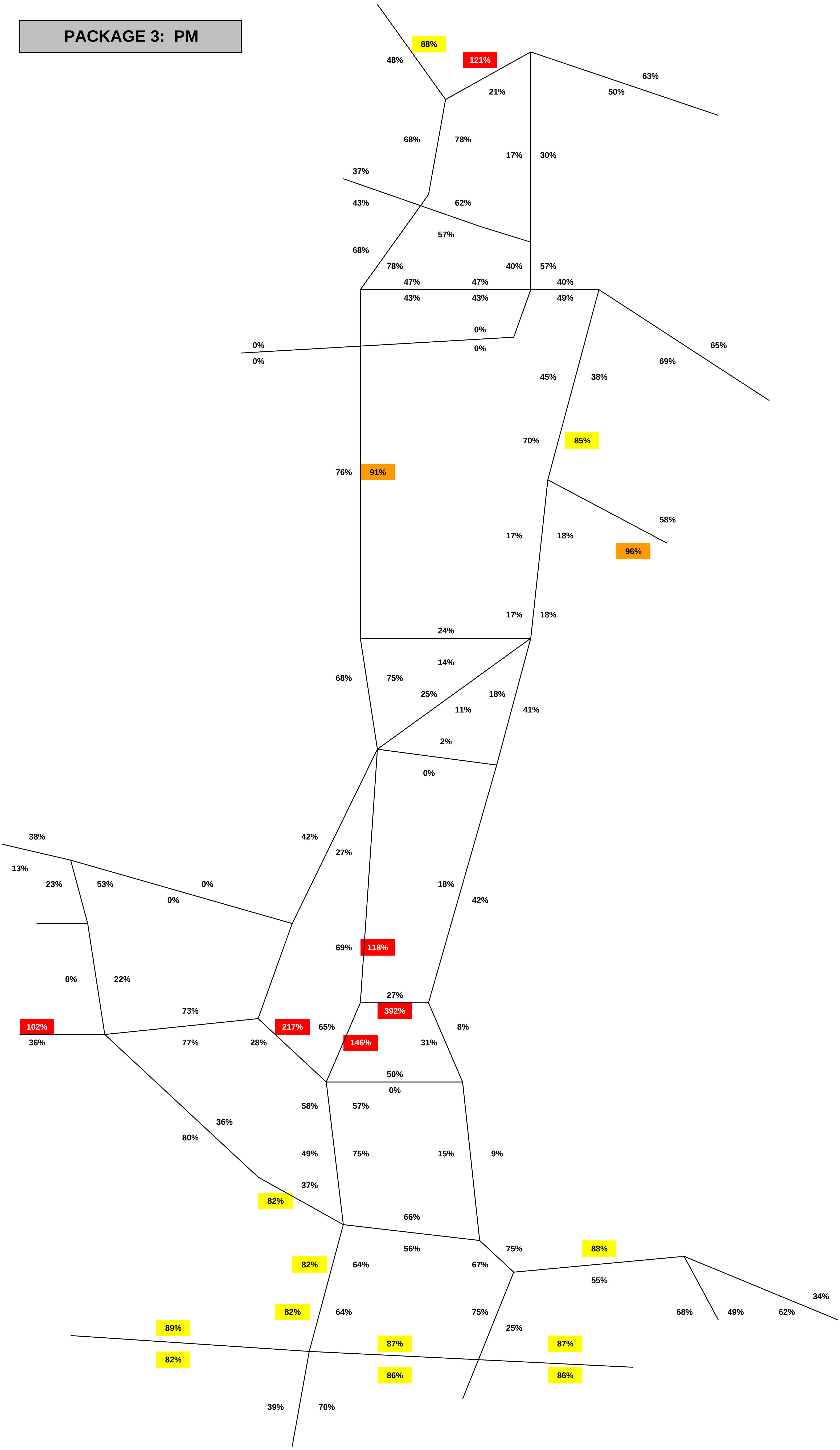

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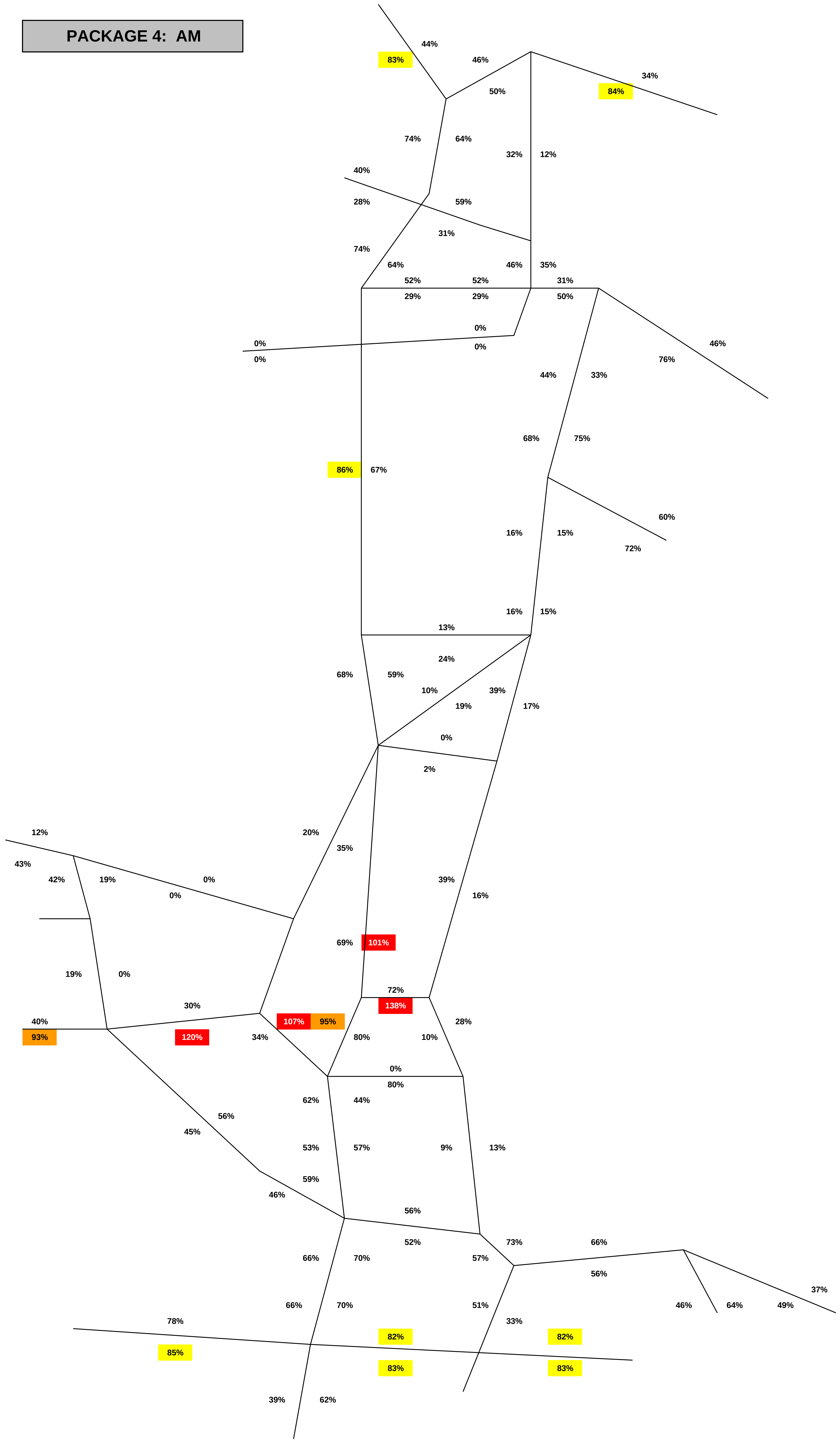

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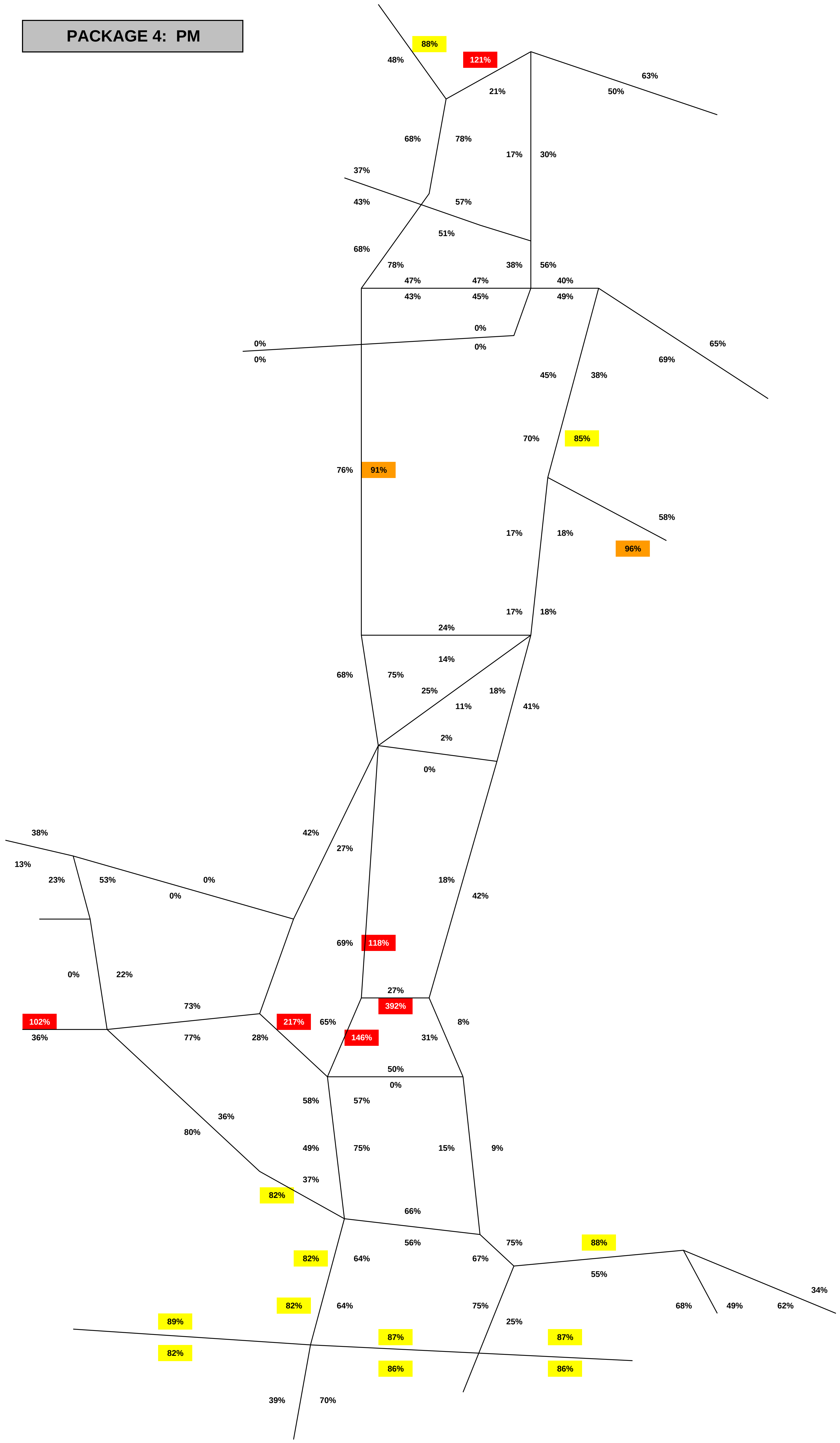
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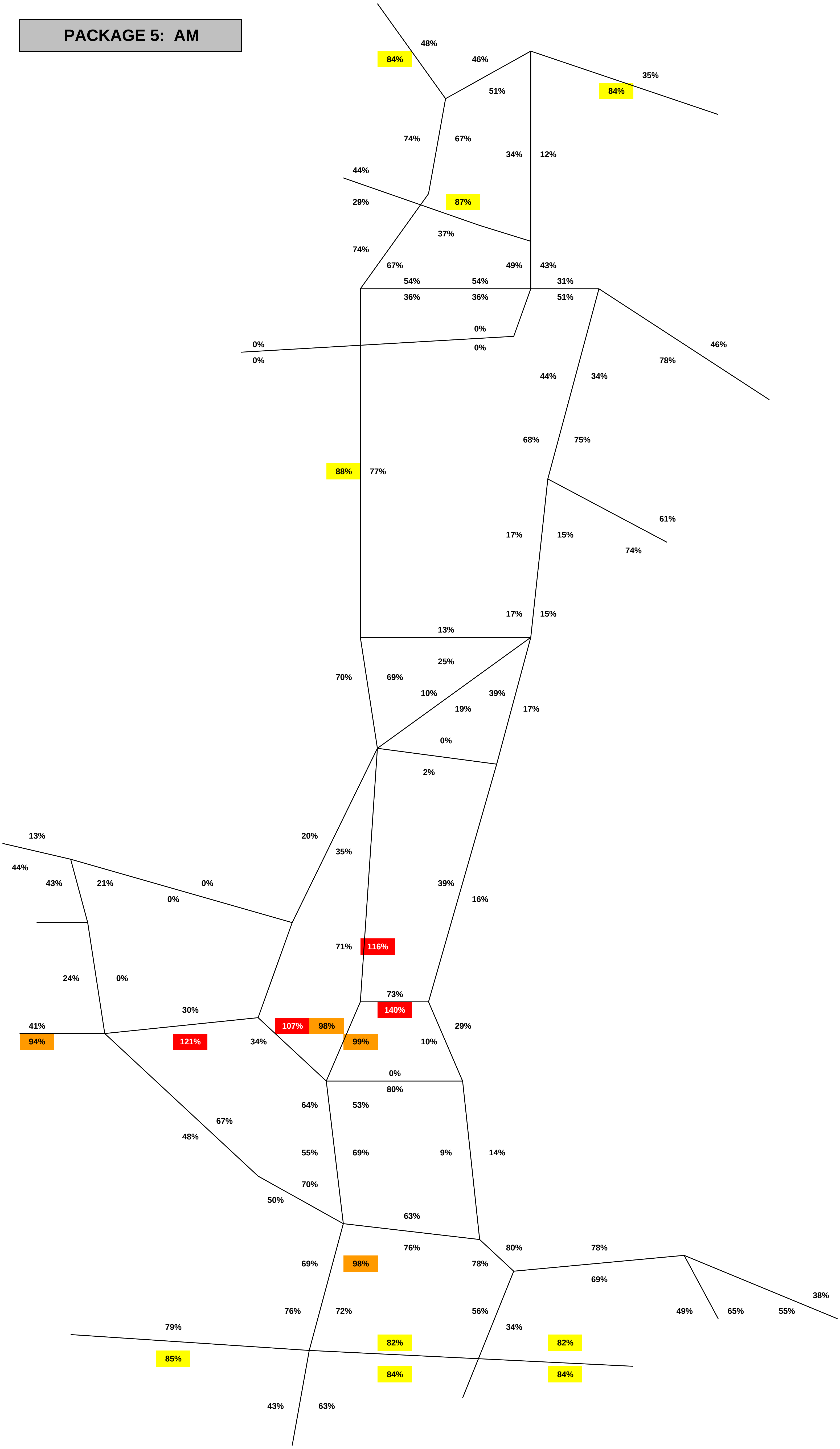
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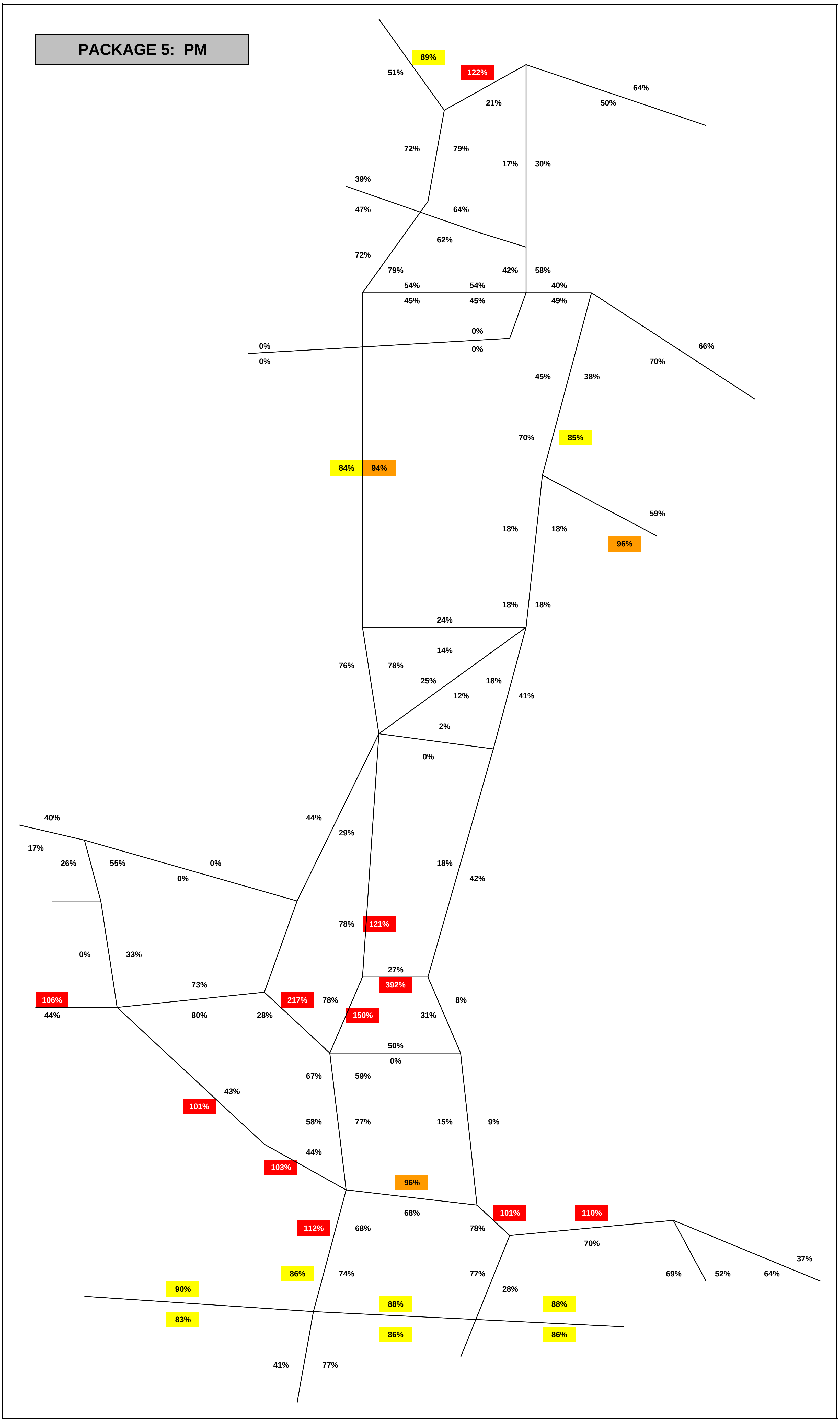
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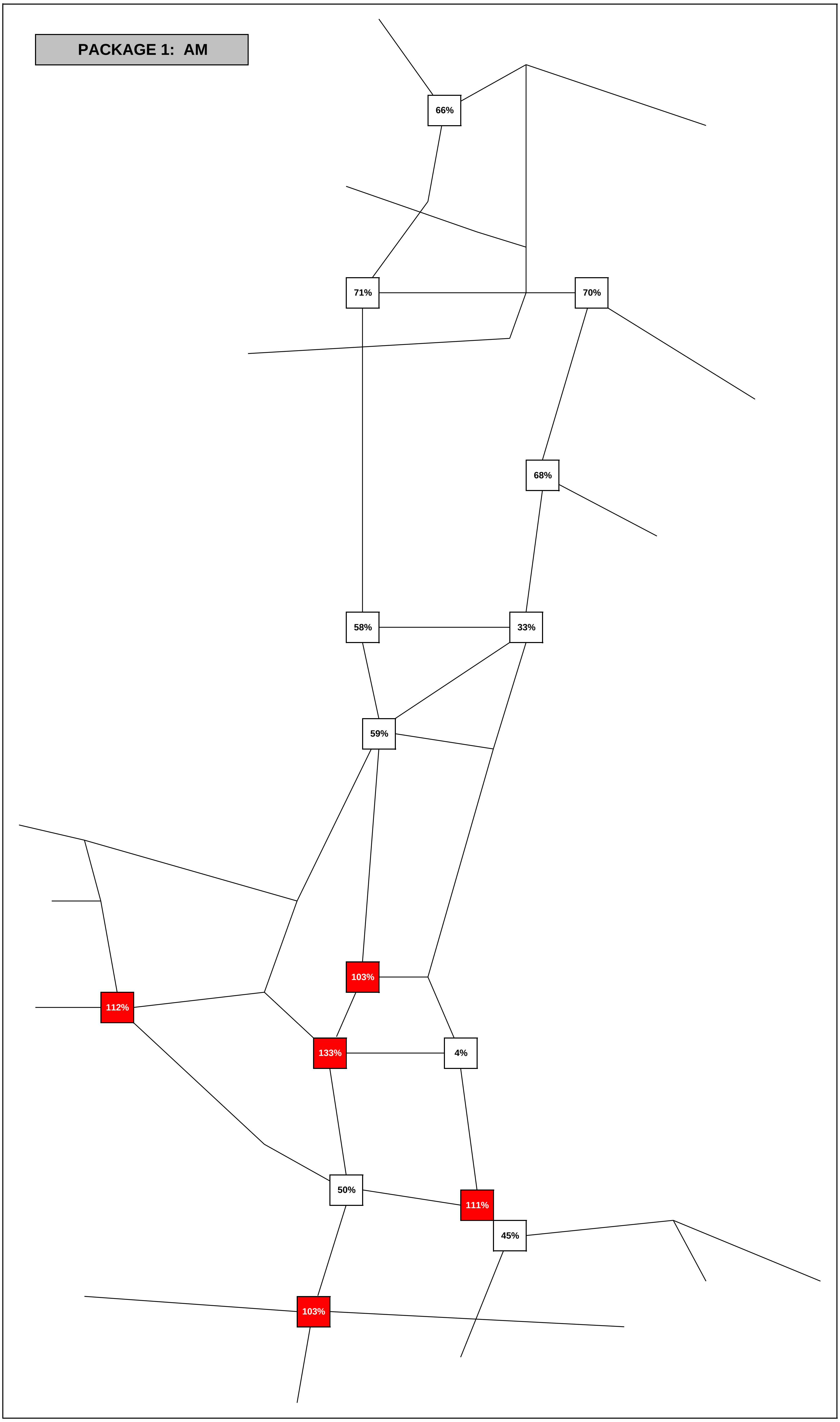
Appendix 12b – Package specific junction V/C %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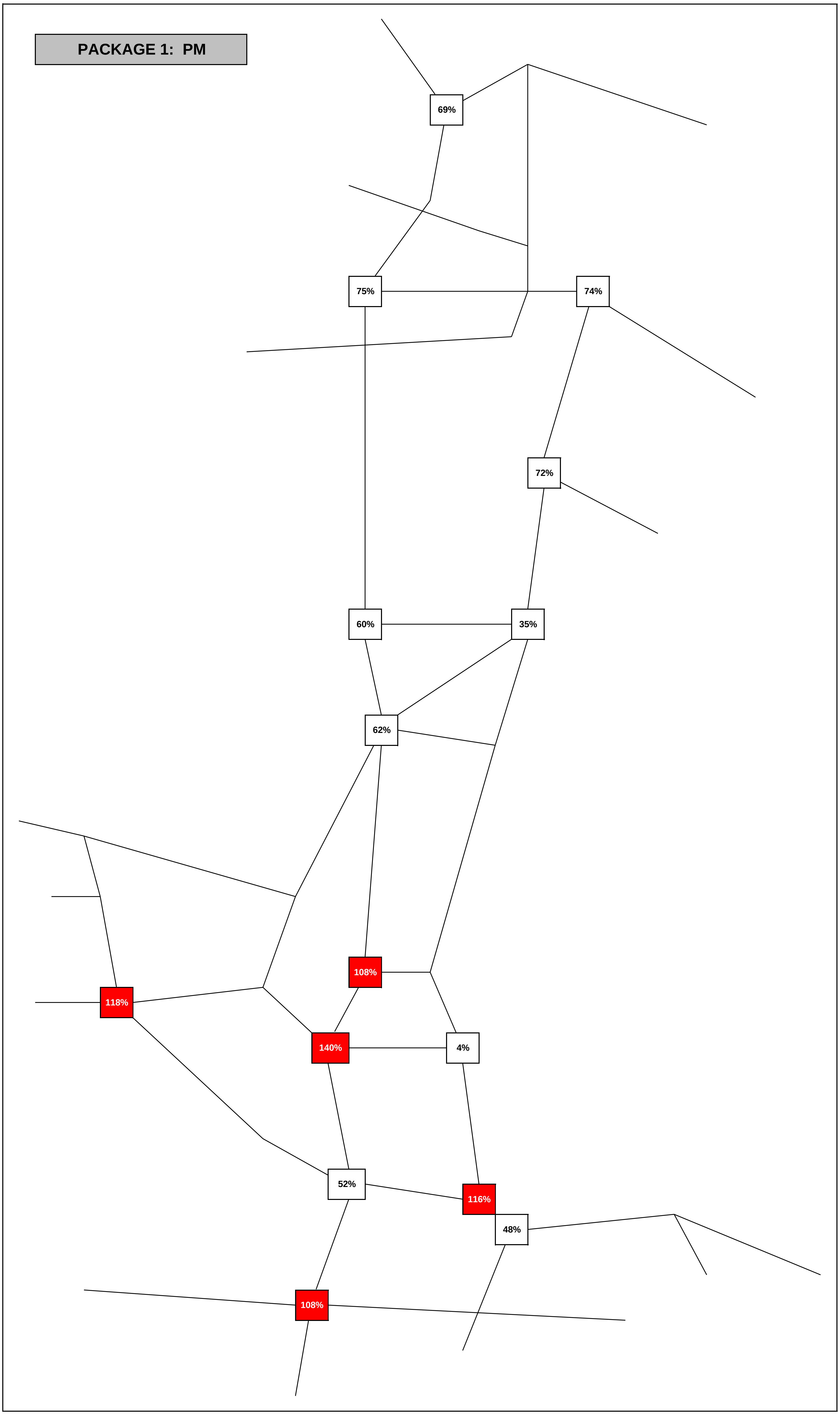
PACKAGE 1: PM
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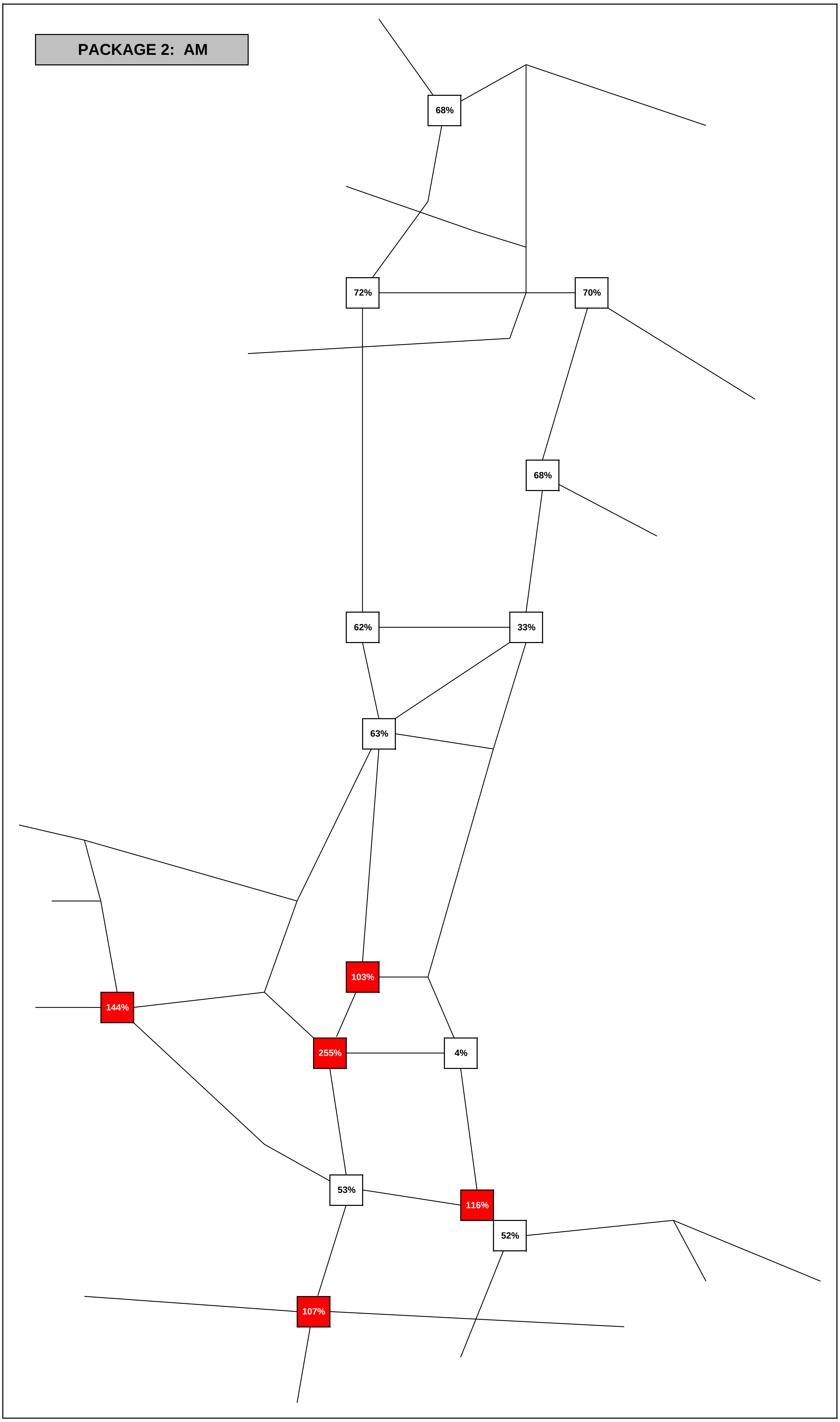
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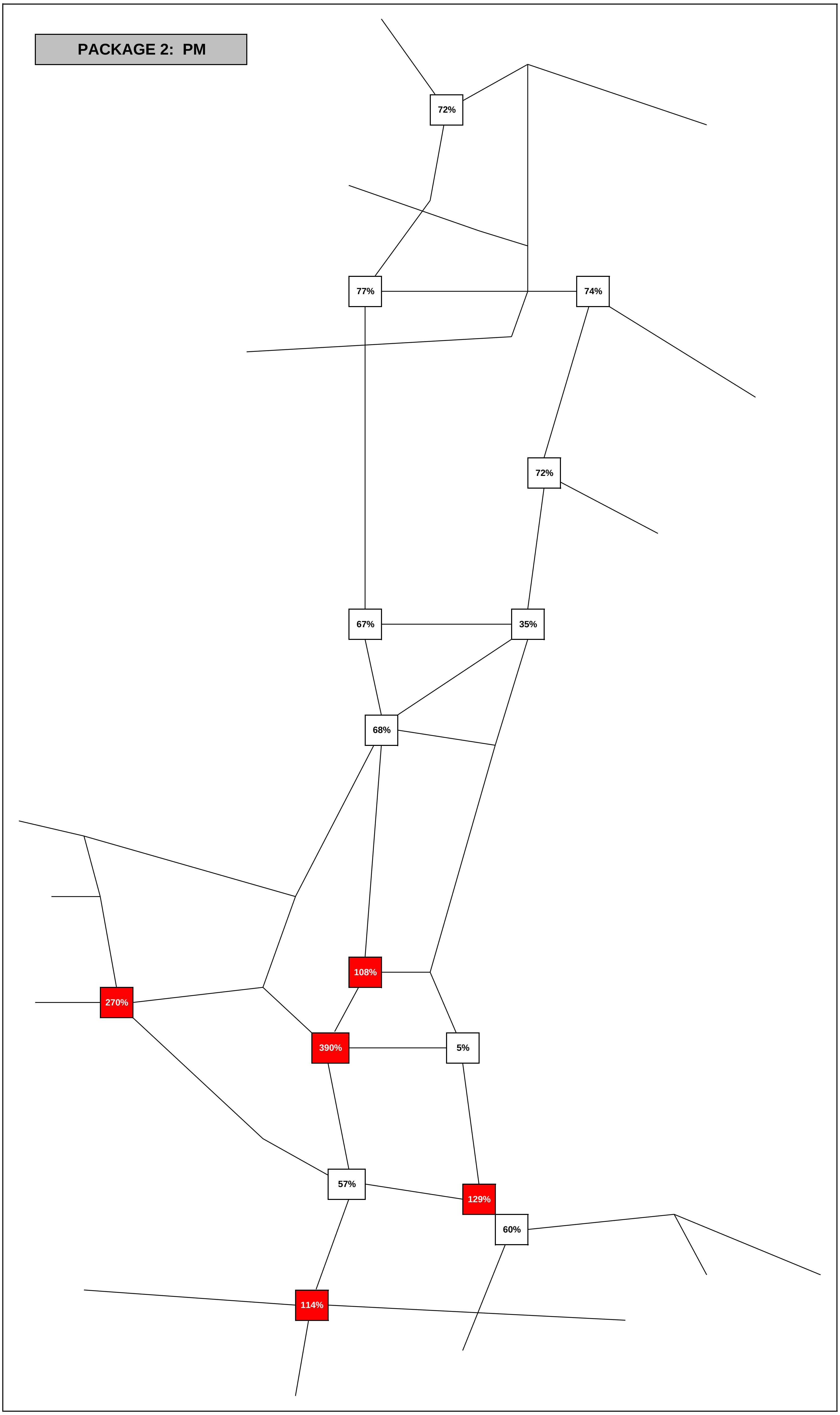

PACKAGE 2: PM
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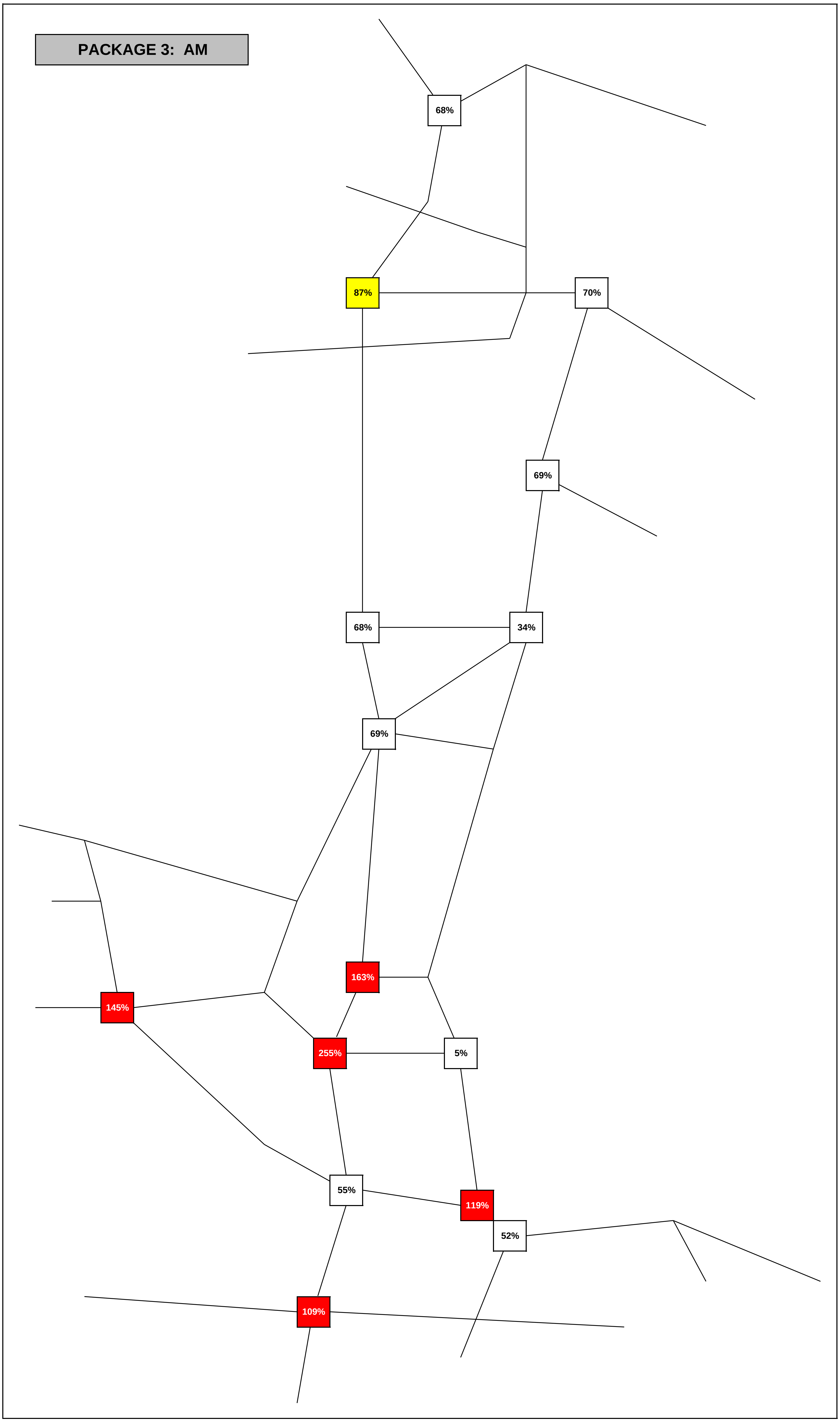
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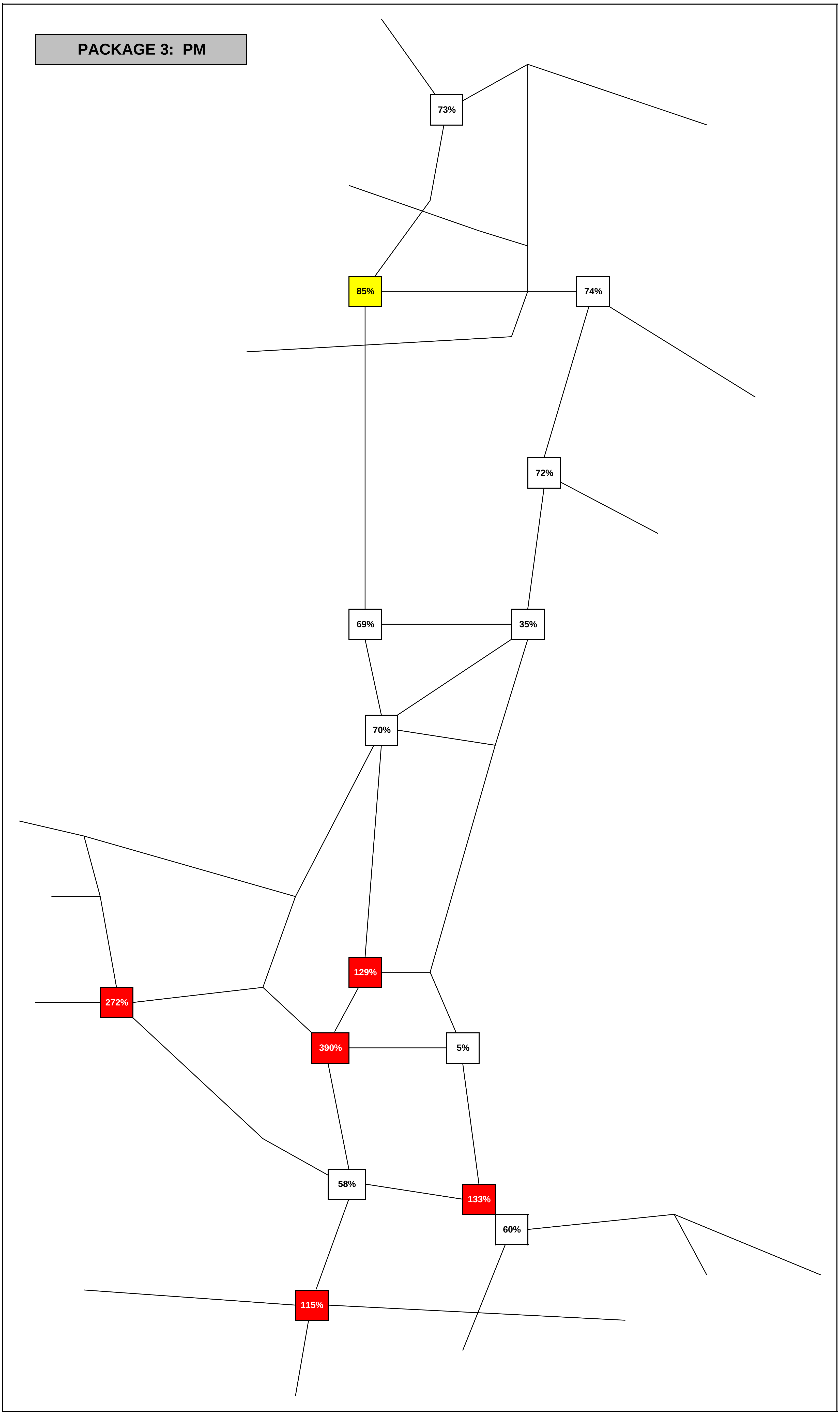
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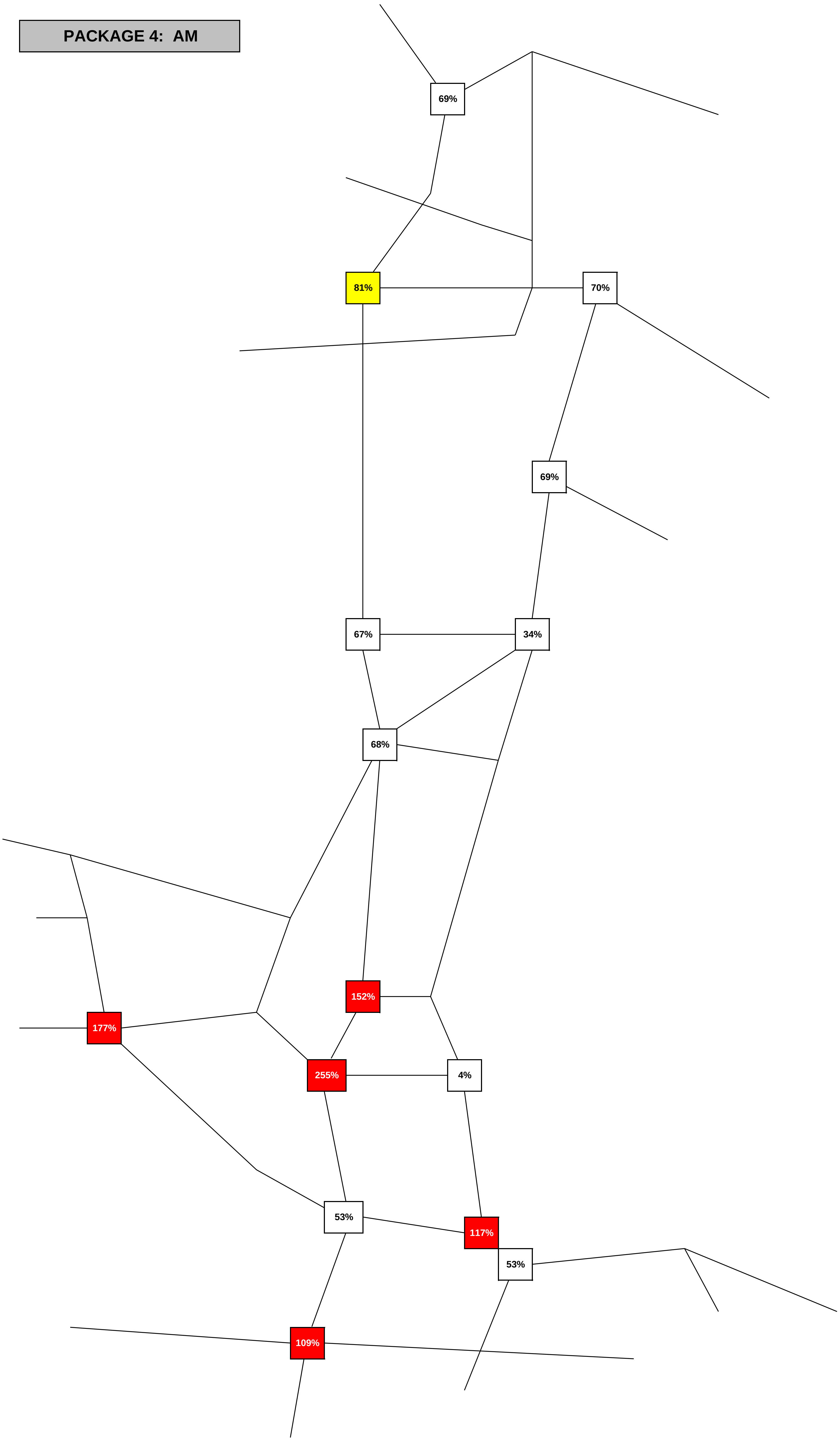
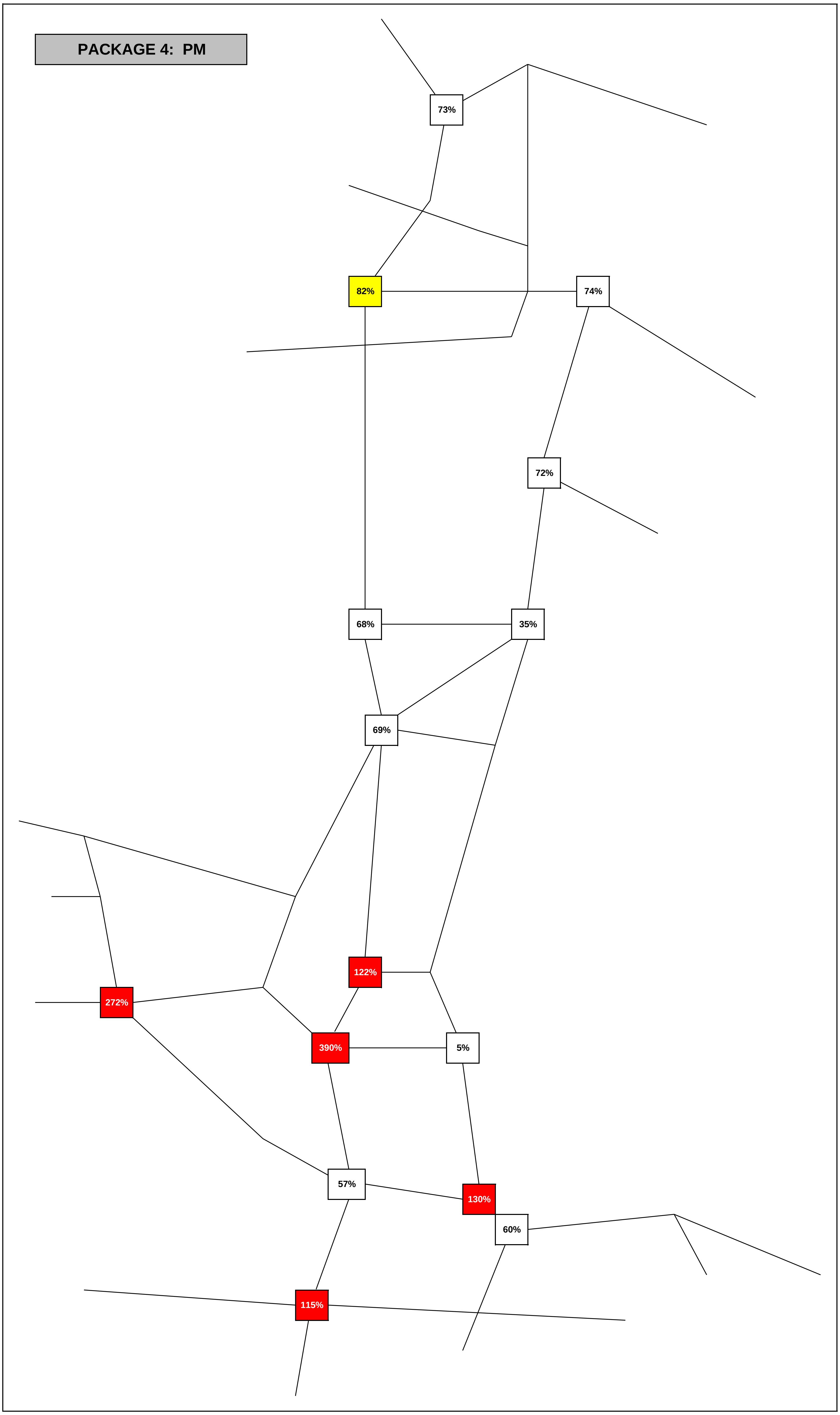
PACKAGE 4: AM

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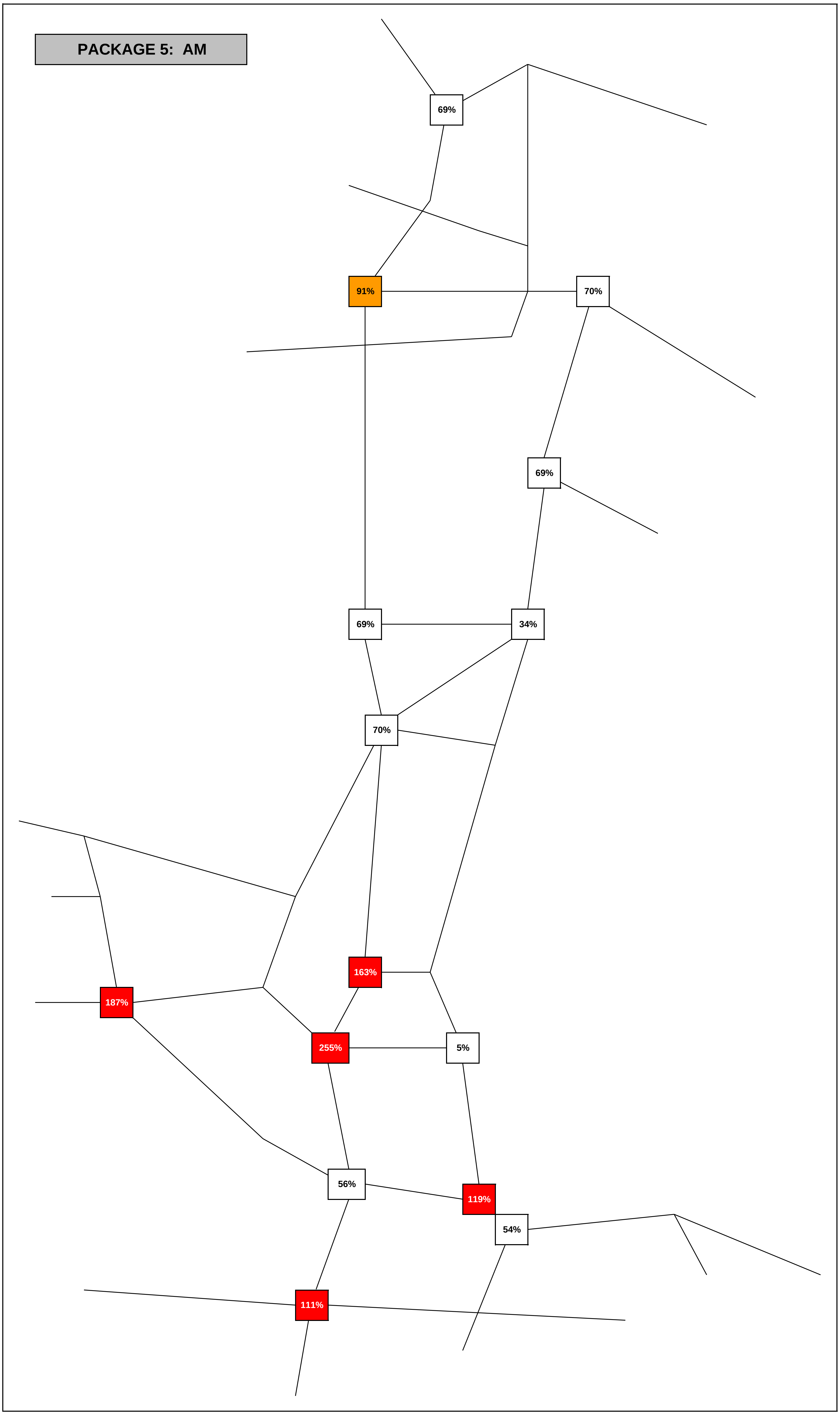
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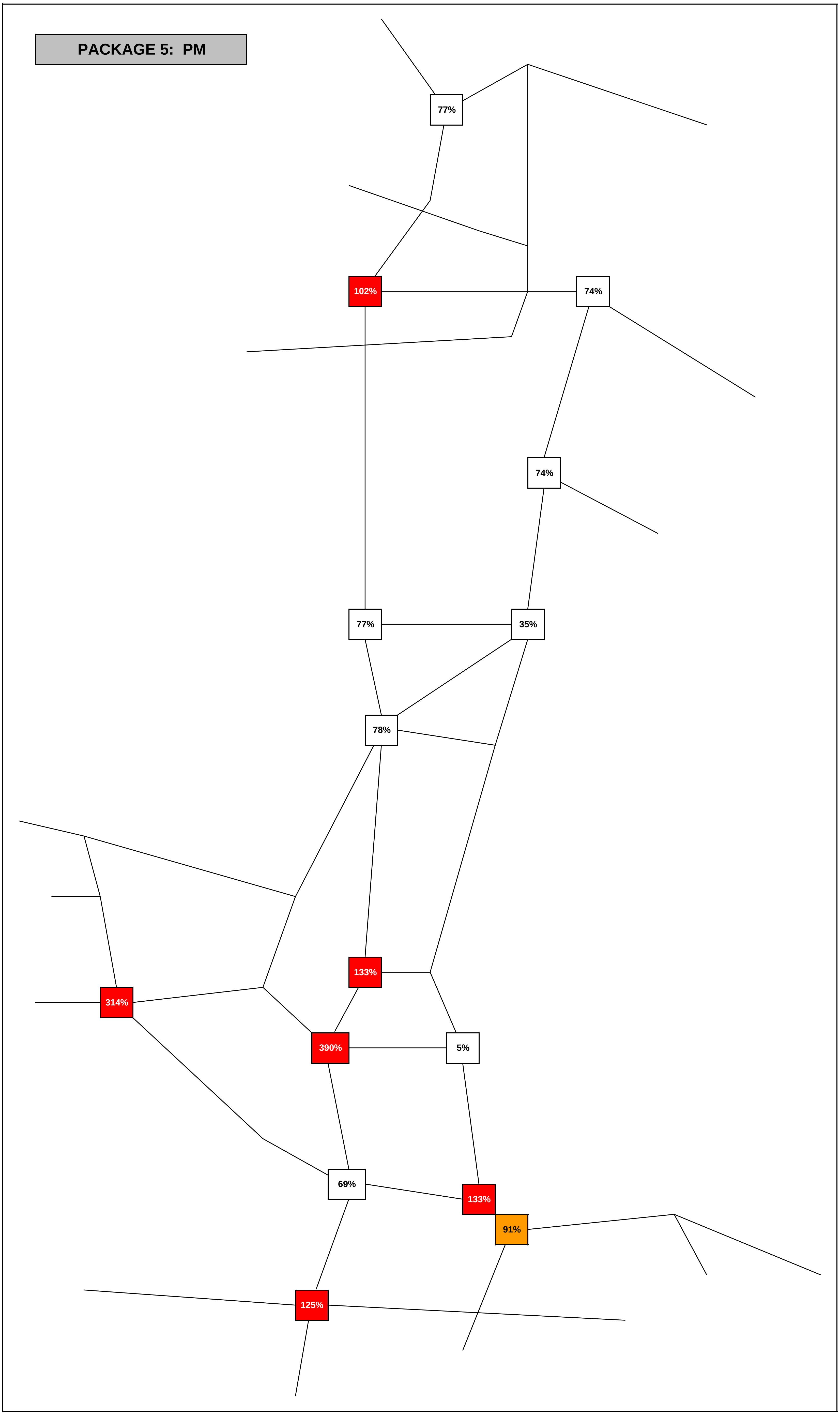
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