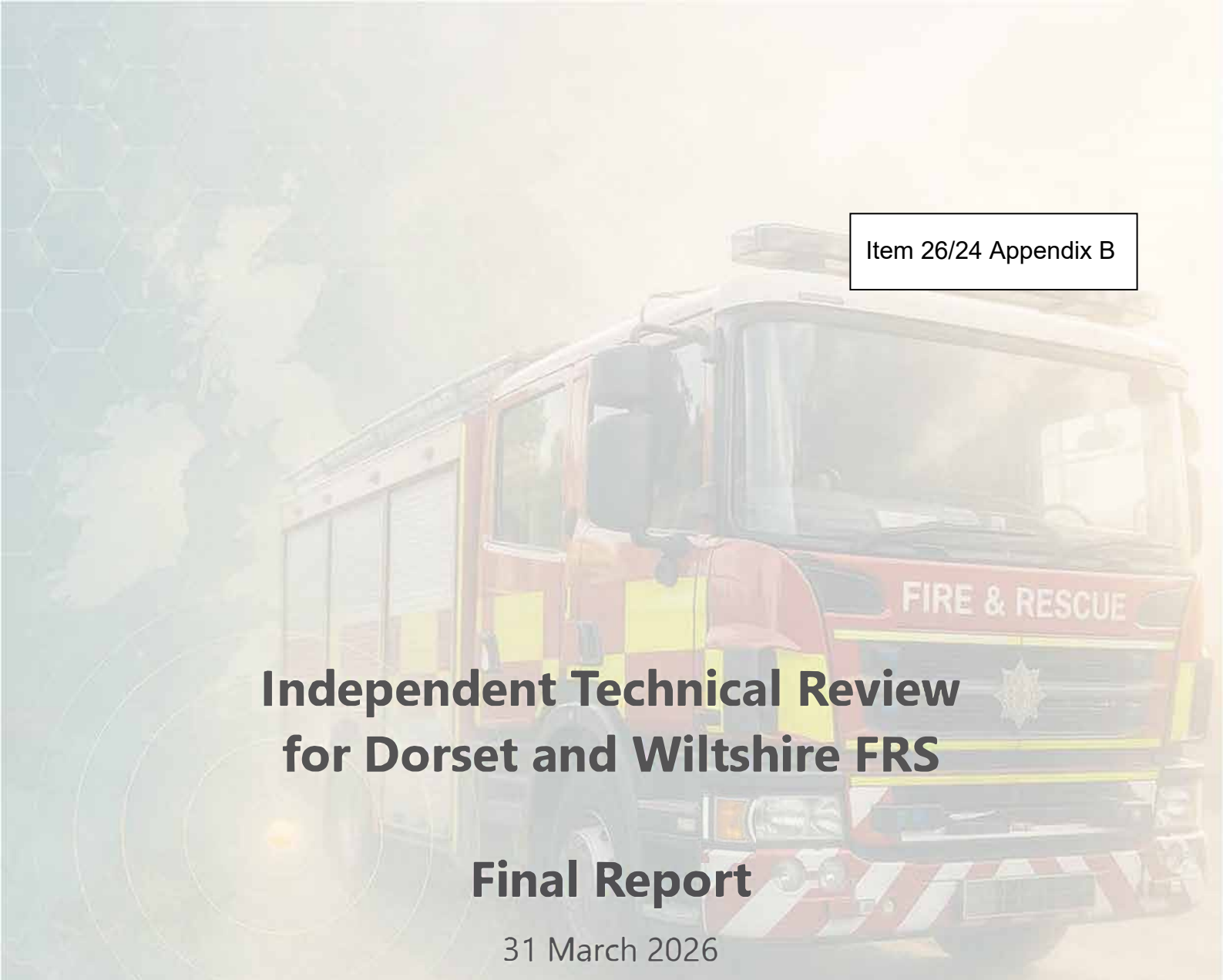
Item 26/24 Appendix B



Independent Technical Review for Dorset and Wiltshire FRS

Final Report

31 March 2026

[redacted]

[redacted]

Contents

Executive Summary

Purpose of the Review

Dorset & Wiltshire Fire and Rescue Service (DWFRS) has undertaken a Fire Cover Review (FCR) to examine whether its station network is aligned with risk and demand across the Service area.

Building on this strategic review, DWFRS has subsequently carried out a series of detailed Station Reviews to assess the potential impacts of specific station changes, including proposals relating to the closure of eight on-call stations. These Station Reviews draw on an analytical framework developed by DWFRS to examine how incident demand and response coverage may change under different station configurations.

DWFRS commissioned [redacted] to carry out an independent review of the analytical methodology. The purpose of the review was to provide assurance to the Members' Working Group that the modelling approach used by DWFRS provides a reasonable basis for examining the potential impacts of the proposals being considered.

The review focused on the analytical methodology rather than the policy decisions associated with the FCR. It considered the data used in the analysis, the construction of response time calculations, the modelling approach used to assess response coverage, and the way incident demand is redistributed within the model when station changes are tested.

Key Findings

In general, the analytical framework developed by DWFRS represents a thoughtful and proportionate approach to examining the strategic questions considered within the FCR.

The model is best understood as a coverage model. It estimates how quickly appliances could theoretically reach incidents and how this coverage would change if stations were removed from the network. The model therefore focuses on geographic response coverage.

This means the model does not attempt to represent factors such as appliance availability or simultaneous incidents. While these factors influence operational response in practice, the use of a coverage-based approach is common in fire cover analysis and provides a reasonable way of examining the impact of station changes.

Across the technical elements that have been reviewed, the methodology used by DWFRS appears suitable for the purposes of this type of strategic analysis. The incident dataset provides a suitable evidence base, travel time modelling aligns with assumptions used within the mobilisation system, and response time calculations are transparent and consistent with existing operational processes.

As with any analytical model, several assumptions are applied, including assuming that two appliances attend each incident and that appliances are available to respond when required. These assumptions simplify operational behaviour but are clearly understood and consistently applied.

The modelling has been developed internally by the DWFRS analytical team, allowing the approach to be maintained and refined over time. The framework also provides flexibility to incorporate additional datasets and risk indicators where appropriate.

DWFRS has published substantial information describing the methodology and the results of the FCR, supporting transparency and helping stakeholders understand how the analysis has been undertaken.

Overall Conclusion

The analytical methodology provides a reasonable and credible framework for examining how incident demand and response coverage may change under different station configurations. While the modelling approach simplifies some aspects of operational behaviour, the assumptions used are suitable for the strategic questions being considered. DWFRS's approach therefore provides a sound analytical basis for the Station Reviews.

Summary of Technical Review

Topic Reviewed	Summary Observation
Data Used in the Analysis	A five-year incident dataset provides a suitable balance between stability and recency for this type of analysis.
Incident Demand Definition	The analysis distinguishes between overall workload and higher-risk incidents for reporting response times. The modelling assumes two pumps attend each incident, which enables consistent analysis through a simplified view of the complexities of incident attendance.
Travel Time Modelling	Travel times are derived in a sensible manner from road network data and are aligned with mobilisation system assumptions.
Response Time Construction	Modelled response times combine call handling, mobilisation and travel time assumptions consistent with DWFRS reporting, but will vary in practice due to a variety of factors, including: speed of call handling, crew turn in and turn out times, road conditions and congestion, etc.
Appliance Availability	The model assumes appliances are always available to respond and therefore represents theoretical coverage rather than actual operational response performance. Availability is analysed separately by DWFRS.
Incident Redistribution	Incidents are reassigned based on calculated response times when stations are removed from the network in an appropriate manner.
Model Architecture	The model is implemented in Excel, supporting transparency and internal maintainability. As with all spreadsheet models, careful quality assurance of formulas and calculations is important.
Risk Indicators	The framework allows vulnerability and other risk datasets to be incorporated into the analysis.
Geographic Reporting	Results are reported at station area level, which reflect the communities currently served. However, these areas would change if stations are removed, meaning future comparisons may require revised reporting geographies.
Model Validation	Internal checks have been undertaken to compare modelled travel times with operational experience and to review incident location data. These checks provide reassurance that the model outputs are suitable.
Documentation & Transparency	DWFRS has published clear information around the methodology and results supporting the FCR. Internal technical documentation of the model structure would benefit from further development to support long-term maintenance.
Model Sustainability	The analytical framework has been developed internally and can be refined in future if required.

1. Introduction and Scope of the Review

Background

Dorset & Wiltshire Fire and Rescue Service (DWFRS) has undertaken a Fire Cover Review (FCR) to examine whether its station network is aligned with risk and demand across the Service area. Building on this strategic review, DWFRS has subsequently carried out a series of detailed Station Reviews to assess the potential impacts of specific station changes. These Station Reviews draw on an analytical framework developed by DWFRS to examine how incident demand and response coverage may change under different station configurations.

DWFRS has published a series of documents describing the FCR and the options being considered within the Station Reviews, including proposals relating to the potential closure of eight on-call stations. These include summary materials and detailed analytical appendices setting out how DWFRS has examined incident demand, response coverage and how the potential impacts of different station configurations have been assessed. The proposals have been presented as part of a public consultation process, allowing stakeholders and the wider community to review the information and provide feedback.

Scope

DWFRS has commissioned [redacted] to carry out an independent review of the analytical methodology used within the FCR programme and Station Reviews. The aim of this review is to provide professional assurance to the Members' Working Group (MWG) that the data analysis and modelling approach used by DWFRS provides a reasonable basis for examining the potential impacts of proposed changes.

This review focuses specifically on the **technical aspects of the methodology**, including:

- the data sources used in the analysis
- the construction of response time calculations
- the modelling approach used to represent incident coverage
- the analytical methods used to assess the redistribution of demand following station changes

The review **does not** include:

- independent verification of the underlying datasets
- re-running the analytical model
- assessment of the policy merits of the station proposals
- evaluation of the broader consultation and engagement process

The purpose of the review is therefore to assess whether the analytical framework used by DWFRS is appropriate for the strategic questions being considered, rather than to reproduce or independently test the model outputs.

2. Review Approach

Methodology

The review was conducted through a combination of document review and direct technical discussion with the DWFRS analytical team.

DWFRS has published a large volume of information around the FCR methodology, including summary reports and detailed technical appendices describing the analysis undertaken for individual stations. These documents were reviewed in advance of the technical discussions.

A full-day meeting was subsequently held with key members of the DWFRS analytical team, the Head of Data and Analytics, and the Programme and Project Analyst, to explore the methodology in more detail. The purpose of this discussion was to understand how the analytical framework had been developed, the assumptions that had been adopted within the modelling approach, and the reasoning behind key methodological decisions.

The discussion was intentionally exploratory and two-way. Questions were asked across a wide range of topics relating to data preparation, modelling assumptions and analytical interpretation. In each case the analytical team were able to explain the reasoning behind the choices that had been made and how the methodology had evolved over time.

It is also notable that DWFRS has adopted an open approach in publishing documentation describing the methodology. High-level summary material and detailed technical appendices are publicly available, allowing the analytical approach to be understood and scrutinised. This level of transparency is positive and provides a useful basis for independent review.

Reviewer Experience

The review has been undertaken by [redacted] of [redacted] an independent consultancy specialising in data analysis, risk modelling and strategic planning within the fire sector. [redacted]

This experience provides a practical understanding of the types of analytical frameworks commonly used within the sector and the strengths and limitations associated with different modelling approaches. The review has therefore been carried out with the intention of assessing whether the methodology adopted by DWFRS represents a reasonable and proportionate approach for the strategic questions being considered within the FCR programme and Station Reviews.

3. Overview of the DWFRS Modelling Approach

The analytical framework developed by DWFRS is designed to examine how incident demand and response coverage would be redistributed under different station configurations.

The model is based on three core components:

1. **Historic incident demand data**, derived primarily from the Incident Recording System (IRS) and mobilising system (Vision).
2. **Travel time modelling**, using road network data and estimated appliance speeds to generate travel time isochrones from each station.
3. **Response time construction**, combining call handling time, mobilisation time and travel time to estimate the expected response time from each station to incident locations.

Using these components, the model assigns each historic incident location to the stations that would be expected to respond first and second based on theoretical response time calculations. This allows DWFRS to examine how the distribution of incidents across stations would change if particular stations were removed from the system, and what this would mean in terms of the impact on response times to specified incident types or risk proxies.

In practical terms, the model represents a form of **geographic response coverage analysis**. It estimates how quickly an appliance could theoretically reach an incident from different locations across the service area, and how that coverage would change under alternative station configurations.

The model **does not attempt to simulate operational behaviour in detail**. In particular, it does not try to represent:

- simultaneous incidents
- dynamic appliance availability
- detailed mobilisation behaviour

Instead, it focuses on understanding the geographic redistribution of demand and theoretical response coverage following station changes. This approach is often used in fire cover analysis and can provide useful insight into the relative impacts of different station configurations, provided the assumptions underpinning the model are clearly understood.

4. Detailed Technical Assessment

4.1 Data Selection and Sampling

DWFRS has based its analysis on incident data drawn from IRS and Vision (DWFRS's mobilising system). For the analysis within the Station Reviews, DWFRS has used a five-year dataset covering the period from April 2019 to March 2024.

The use of a five-year dataset represents a reasonable balance between capturing sufficient incident volume for stable analysis, while still reflecting recent operational activity. In FRSs with relatively low incident volumes, shorter datasets can produce unstable results, while much longer datasets may incorporate historic patterns that no longer reflect current conditions.

DWFRS has chosen to include data from the COVID-19 period rather than attempting to exclude specific time periods. This approach is consistent with national guidance and avoids the risk of selectively removing data that may introduce unintended bias.

Overall, the data sampling approach appears reasonable for the purposes of the analysis.

4.2 Incident Demand Definition

Incident Types

All incident categories have been included when examining overall workload within station areas. However, when reporting response time impacts the analysis focuses on incident types that are most closely associated with life risk and operational performance measures, such as property fires and road traffic collisions (RTCs).

This distinction between total workload analysis and response time reporting appears appropriate. Considering all incidents provides a fuller understanding of station workload, while focusing response time analysis on higher-risk incident types ensures that the modelling remains aligned with public safety outcomes.

Incident locations are derived from historic incident data and used as the geographic basis for the modelling, allowing the analysis to examine how demand would redistribute across the network of stations under different configurations.

Multi-Appliance Incidents

For modelling purposes, DWFRS has assumed that each incident receives two responding appliances. While it is recognised that some incidents require only a single appliance and others may require several more, the two-appliance assumption is reflective of the average number of appliances mobilised to incidents and provides a consistent basis for analysing demand redistribution.

As with any modelling exercise, this represents a simplification of real operational behaviour. In practice, the number of appliances attending incidents varies depending on incident type, location and operational judgement. It should also be recognised that applying a consistent two-appliance assumption may slightly influence how demand redistribution is represented within the model. If this assumption is understood as a modelling simplification rather than a

precise representation of operational activity, it provides a transparent basis for evaluating potential changes.

4.3 Travel Time Methodology

Deriving Travel Times

Travel times within the model are derived using road network data combined with estimated appliance speeds based on previous analysis undertaken by Nottinghamshire Fire and Rescue Service. These speeds are applied to different road classes to estimate expected travel times.

Using this information, DWFRS has generated travel time isochrones at 20-second intervals from each station up to 30 minutes. These isochrones are then used to determine the expected travel time between each station and each incident location.

A particularly positive feature of the approach is that the travel time assumptions used in the model are aligned with those used within the mobilisation system. This means that the travel time estimates used for strategic analysis are consistent with the calculations used when mobilising appliances to real incidents.

While the model does not explicitly account for factors such as time-of-day congestion or urban-rural speed differences, the use of consistent travel time assumptions provides a reasonable basis for comparing options.

Quality Assurance

Travel time assumptions represent a fundamental input to this type of modelling approach. The accuracy of the model outputs is therefore closely linked to the quality of the underlying travel time estimates. As part of [redacted]'s review, the isochrone calculations themselves were not examined in detail, although the analytical team described the quality assurance checks that were undertaken when generating the travel time isochrone layers.

Continued scrutiny of these assumptions is important, as travel time estimation is often one of the areas where modelling approaches can be most sensitive to error. Ensuring that these estimates remain consistent with observed operational experience will therefore remain an important part of maintaining confidence in the modelling approach.

4.4 Response Time Construction

The model constructs response times by combining three components:

- call handling time
- mobilisation time
- travel time

Call handling time is assumed to be 1.5 minutes for all incidents. Mobilisation time is assumed to be two minutes for wholetime stations and five minutes for on-call stations. These assumptions are consistent with the mobilisation parameters used within the DWFRS mobilising system, and are broadly aligned with other FRSs.

While mobilisation times vary in practice (both by station and by time of day), the use of consistent assumptions provides a transparent and comparable basis for analysing response coverage across stations.

The response time calculations used within the model are also consistent with the way response performance is currently reported by DWFRS. Aligning the analytical approach in this manner helps ensure that the outputs of the modelling can be interpreted in a way that is consistent with existing performance reporting and operational understanding.

4.5 Appliance Availability Assumptions

Approach

For modelling purposes the analytical framework assumes that appliances are available to respond whenever required. **The model therefore represents theoretical response coverage rather than operational response performance**.

DWFRS recognises that on-call appliance availability varies over time and by station. However, the decision was taken not to incorporate availability directly into the station location model in order to maintain a clear focus on the geographic distribution of demand and response coverage.

Availability data is analysed separately using detailed availability records, allowing DWFRS to examine whether neighbouring stations are likely to provide sufficient coverage at the times when incidents occur.

'Coverage' vs. 'Response'

While the assumption of full availability is a simplification, it does not undermine the usefulness of the model, as long as it is interpreted as a coverage analysis rather than a full operational simulation.

This distinction is important when interpreting the results of the analysis. A coverage model examines whether an appliance could theoretically reach an incident location within a given time based on travel distance and station location. In practice, actual response performance will always be influenced by factors such as appliance availability, traffic conditions on the day and the potential for simultaneous incidents.

In services with very high vehicle utilisation, such as ambulance services, these factors can have a significant impact on response performance and require more detailed simulation modelling. In the fire and rescue context, where appliance utilisation is typically much lower, coverage-based analysis can still provide a useful and proportionate way of understanding how changes to station locations may affect response capability across the area.

4.6 Assumptions and Sensitivity

The modelling approach relies on a number of simplifying assumptions, including travel time estimates, mobilisation times and appliance availability. During discussions, the analytical team demonstrated a clear understanding of these assumptions and their potential influence.

[redacted]

While the model does not include formal sensitivity testing of alternative assumptions, the analytical framework is sufficiently transparent that such testing could be undertaken in future if required (for example, what would be the effect of increasing on-call mobilisation times, or reducing wholetime mobilisation times?).

4.7 Incident Redistribution Methodology

The model redistributes incidents based on theoretical response times from each station. When stations are removed from the system, incidents that would previously have been served by those stations are reassigned to the next nearest stations based on calculated response times.

The analysis considers the combined effect of all proposed station changes rather than modelling each station independently. This allows interactions between neighbouring stations to be captured more realistically.

While the assumption that each incident receives two appliances introduces some simplification in the redistribution process, it provides a consistent basis for comparing changes in workload between stations.

4.8 Model Architecture

Approach

The analytical model has been developed within Microsoft Excel. While more complex modelling environments are sometimes used in emergency service analysis, the use of Excel offers advantages in terms of transparency and accessibility.

The structure of the model allows calculations to be inspected directly and makes it easier for the methodology to be maintained internally by DWFRS over time. The use of a widely understood platform such as Excel also makes it easier for other analysts within the organisation to review the calculations and undertake quality assurance checks where required.

The model is therefore intentionally designed to be transparent rather than highly complex, which is appropriate for the nature of the analysis.

Quality Assurance

As part of this review the detailed workings of the Excel model were not examined directly, with the focus on the wider approach rather than verifying individual calculations.

As with any spreadsheet-based analytical model, maintaining robust QA processes is important to ensure that formulas and data links remain accurate. This is particularly relevant where complex calculations are involved, as errors within a spreadsheet model can have a significant impact on the results if they are not identified through routine checking. During discussions, the analytical team described a number of internal QA processes used in developing and maintaining the model, including checking of calculations and outputs.

4.9 Risk Proxies and Vulnerability Data

In addition to incident demand data, DWFRS has examined a range of additional risk indicators, including locations associated with higher levels of vulnerability identified through Safe and Well activity, as well as specific site-based risks.

The modelling framework allows these datasets to be overlaid onto the travel time analysis, enabling DWFRS to examine how response coverage may affect areas associated with higher levels of risk.

This capability represents a positive feature of the analytical approach. By allowing additional datasets to be incorporated into the analysis, the framework provides flexibility to explore how different types of risk information may interact with response coverage across the area.

The specific proxies currently used represent a reasonable selection of risk indicators for this type of analysis. In practice there is no single definitive set of risk proxies that should be applied, and different FRSs may choose to focus on different datasets depending on local priorities and data availability.

The structure of the DWFRS model therefore provides a useful platform should DWFRS wish to incorporate additional datasets in the future. However, it is also important that the number of variables considered is proportionate, so that the analysis remains clear and interpretable.

4.10 Geographic Reporting

The analysis is primarily presented at the level of station areas. These station areas represent the historic operational areas associated with each station.

DWFRS explained that this approach was chosen because it allows the analysis to show how incident demand currently associated with a particular station area would be redistributed if that station were no longer available. Presenting the results in this way therefore provides an illustration of the potential impacts on the communities currently served by each station.

It is recognised that these station area boundaries would inevitably change if stations were removed or relocated. However, using the existing areas provides a practical and easily understood basis for presenting the results.

In principle, the modelling outputs could also be reported using a range of alternative geographic units, such as local authority areas, wards or other statistical geographies. However, the choice to present the analysis at station area level provides a clear link between the modelling results and the operational footprint of the station network.

The analysis also considers impacts across the DWFRS area as a whole, allowing both local and service-wide impacts to be examined.

4.11 Model Validation

Data Validation

DWFRS has undertaken internal sense-checking of the travel time calculations by comparing expected travel times with historic attendance times in selected cases. This allows the

analytical team to examine whether the travel time assumptions used within the model are consistent with operational experience.

Additional quality assurance checks have also been undertaken during the preparation of the modelling dataset. These include reviewing incident location data where unusually long travel times appear within the historic records and checking that incident locations are correctly positioned. These checks help identify instances where data anomalies may affect the modelling outputs.

While it is not possible to validate every incident location or travel time estimate directly, these types of checks provide a reasonable level of assurance that the model inputs are aligned with observed operational behaviour.

Quality Assurance Processes

Quality assurance also applies to the construction of the analytical model itself. As with any spreadsheet-based modelling framework, it is important that formulas and data links are periodically checked to ensure they continue to operate as intended. The analytical team described internal checks undertaken during the development of the model to identify and correct issues where they arise. It is recommended that these are continued and become part of the internal documentation process (see below).

4.12 Documentation and Transparency

Internal Documentation

The analytical team have begun documenting the modelling methodology and intend to further formalise this documentation as the analytical framework continues to evolve.

It is common for detailed technical documentation to develop gradually alongside analytical models, particularly where the methodology itself is evolving during the development process. DWFRS recognises that further documentation will be beneficial in fully capturing the assumptions, data sources and analytical steps used within the modelling framework.

Developing this documentation will help ensure that the methodology can be readily understood and maintained in the future. Clear internal documentation can also support business continuity by ensuring that the analytical framework can be reviewed, updated or further developed by other analysts if required.

Public Reporting

Alongside this, it is notable that DWFRS has taken a transparent approach in publishing a substantial amount of information describing the FCR methodology and the station-level analysis. This level of openness is positive and helps stakeholders understand how the analysis has been carried out.

Developing more detailed **internal process documentation** (i.e. describing the methodology, data sources and analytical steps) would complement the material already published and help ensure that the methodology can continue to be understood, reviewed and developed in the future by DWFRS. This does not need to be public-facing.

4.13 Model Sustainability and Future Development

An important feature of the analytical framework is that it has been **developed and implemented internally by the DWFRS analytical team**. This means that DWFRS has a clear understanding of how the model operates and how it can be adapted or extended in future if required.

The ability to maintain and develop the model internally provides flexibility for DWFRS as analytical needs evolve over time. Rather than representing a fixed piece of analysis, the framework can be refined to explore different types of operational or strategic questions as they arise.

During discussions with the analytical team it was clear that the model has already evolved through the development process, and that further refinement may be possible in future should DWFRS wish to explore additional questions. Potential areas for development could include, for example:

- incorporating different assumptions around appliance availability
- examining results across different geographic reporting areas
- exploring additional risk indicators where relevant

These potential developments should not be viewed as necessary enhancements to the current work. The analytical framework already provides a reasonable basis for examining the strategic questions considered within the FCR programme and Station Reviews. However, there is always scope for enhancing certain elements of the model, and it should be considered as a living application, with the option to tailor it towards specific needs.

5. Key Observations and Conclusions

[redacted]'s review indicates that the analytical framework developed by DWFRS represents a thoughtful and proportionate approach to examining the potential impacts of changes to the station network.

A particularly positive feature of the work is the clear understanding demonstrated by the DWFRS analytical team of the model they have developed. During discussions, the team were able to explain the reasoning behind the main assumptions used in the analysis and how the approach had evolved during the development process. This level of understanding helps ensure that the model is interpreted appropriately and can continue to develop over time.

The analytical approach used within the Station Reviews is best understood as a coverage model, examining the theoretical response times that appliances could achieve across the Service area. The model therefore focuses on the geographic distribution of demand and response coverage rather than attempting to simulate operational behaviour in detail.

While this approach simplifies some aspects of real operations, it is consistent with the strategic nature of the questions being considered within the Station Reviews. In particular, the modelling does not attempt to represent dynamic appliance availability or simultaneous incidents. In the fire and rescue context, where appliance utilisation is typically relatively low, this type of coverage-based analysis will provide a useful way to understand how changes to station locations may affect response capability.

Across the individual elements of the methodology reviewed, the approach adopted by DWFRS appears suitable. The data sampling approach provides a sufficient dataset for analysis, the travel time modelling aligns with mobilisation system assumptions, and the response time calculations are transparent and consistent with existing operational processes.

As with any analytical model, a number of simplifying assumptions are used, including that two appliances attend each incident and that appliances are available to respond when required. While these assumptions do not fully reflect operational behaviour, they are clearly understood by the analytical team and applied consistently within the model.

The modelling framework also has several positive features. The ability to incorporate additional risk indicators provides flexibility to explore different types of risk information, while reporting at station area level provides a clear link between the analysis and the communities currently served by each station.

It is also notable that DWFRS has published a substantial amount of information describing both the methodology and the results of the FCR and Station Reviews. This level of transparency helps stakeholders understand how the analysis has been carried out.

Overall, the methodology used within the Station Reviews provides a reasonable analytical framework for examining how incident demand and response coverage may change under different station configurations. While the modelling approach simplifies some aspects of operational behaviour, the assumptions used are suitable for the strategic questions being considered. The work undertaken by DWFRS therefore provides a credible basis for the analysis presented within the Station Reviews.