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## Mapping Operations

### Introduction

The purpose of this guidance document is to help operational personnel to gather, record, and display information from the incident ground. This will assist the Incident Commander (IC), and rescue personnel to locate and recover trapped and injured persons.

### Overview

The aim is to produce a consistent and accurate plan or map for both the IC and the rescue crews. It should also provide evidence for any subsequent legal investigation or action.

This map would form part of the initial information gathering stage under the larger remit of the SOP “SSA001 Structural and Scene Assessment”.

Risk-critical information should be made available as soon as possible. This is to help crews to undertake their duties safely, particularly in the early stages.

It is anticipated that this information will be available nationwide in a simple user friendly format, wherever in the country it may be required. It is important that the information relating to building identification, conditions, hazards and victim status will be posted in a standardised way.

### Action

In the early stages of an operation the IC would require basic yet accurate information from the incident ground, in order to assess the required level of response. In order to obtain this information, it is important that the incident is mapped as early as possible. It is anticipated that a mapping and survey team, as part of the USAR reconnaissance team, may perform this activity before starting USAR operations. In many cases this may have already been performed to some degree by the initial attendance from the host brigade.

The initial structural triage and assessment should then be carried out to help identify, select and prioritise the buildings where it is most likely there will be live victims. The second size up is more thorough.

Once the overall size of the incident, casualty numbers, hazards and triage have been established, then more thorough and accurate information may be sought and disseminated. Some of the mapping information to be considered is detailed below.

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### Initial Size Up

The survey team should consider a short triage and reconnaissance of the buildings and roads in the area. Identification of the structure locations should be established during this triage process, and would include important information that the incident commander would require very early on in the incident.

The mapping and survey team may consider the following:

- Identify buildings individually
- Building type/occupancy
- Street names, grid ref, A-Z
- Obvious casualty locations
- General area triage (identify buildings with the highest potential for rescues)
- Hazards (services, voids, explosive devices, fire, drop zones etc)
- Map orientation
- Wind direction
- Topography
- Access points
- Scale
- Date and time

### Full Size Up

As soon as time allows, the survey team should consider a full size up and mapping of the incident. This will enable the incident commander and rescue crews to see the extent of the USAR operations, the resources required, and the location of possible casualties and survivable voids.

For the full size up, the mapping and survey team should additionally consider marking the following on the map or plan:

- Rendezvous points
- Possible sectors/sites
- Vehicle routes in/out
- Base of operations
- Incident command point
- Helicopter landing point and approaches
- Marshalling – away from area (vibrations)
- Inner/outer cordons
- Other services/agencies command points/liaison points
- Services
- Structural features
- Points of entry/access
- Cordons
- Resources available and equipment caches
- Eye witness information and interviews – building occupancy lists
- Action taken
- Locations of extricated persons

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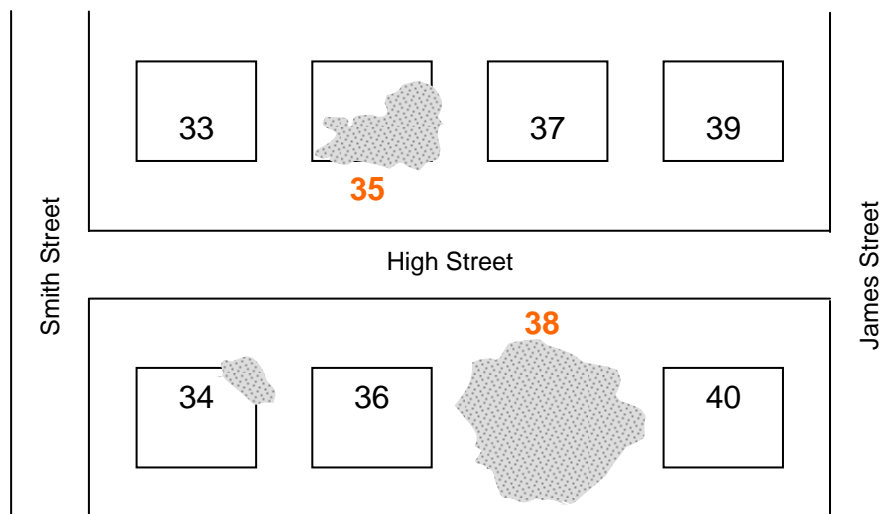
### Building Identification

An important duty of the mapping and survey team is to clearly differentiate buildings in groupings, such as by roads or command sectors, and clearly identify specific search areas within these buildings and sectors. This geographic identification of buildings and sectors will be consolidated at the incident command point. This information will be used to deploy search and rescue personnel and track the structure and search efforts being made.

### Identification at Large Scale/Multi Building Incidents

If an incident involves multiple buildings it is imperative to identify each structure within a geographic area. This identification will assist both in the specific ongoing search and rescue effort and, in the long term, post-disaster identification of the site.

1. The system builds upon the normal pre-disaster street names and building numbers. The mapping and survey team will identify each structure by the existing street name and building number:
2. If some previously existing numbers have been obliterated, an attempt should be made to re-establish the numbering system based on one or more structures that still display an existing number. These damaged building(s) should have numbers assigned and the front of the structure, clearly marked using International orange spray paint.
3. If no number is identifiable in a given area then the mapping and survey team will identify the street name and the building numbers for the area in question based on other structures in proximity to the site in question. The front of the structure should then be marked clearly in international orange spray paint.



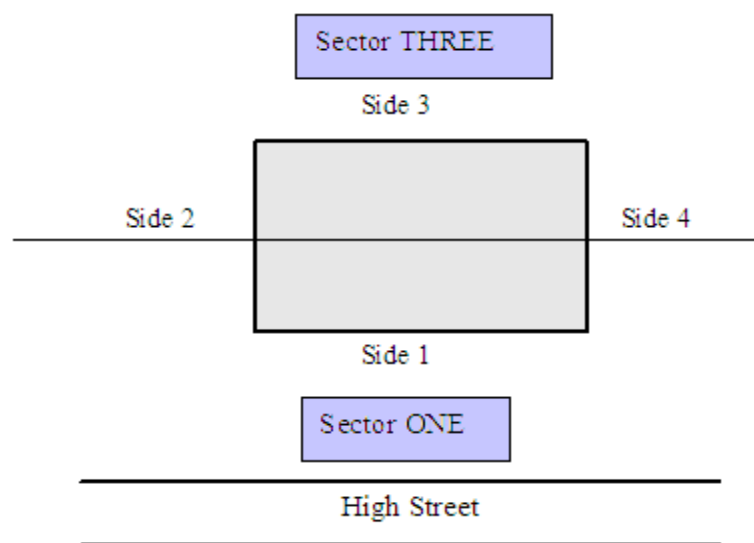
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### Identifying Sectors and Sides

It is important to identify the parts of a building and thus ultimately the possible working sectors required to run an incident. First, it is necessary to define the manner in which these parts are mapped.

For mapping and location purposes, the address side of an individual structure shall be defined as Side 1. Other sides are numbered in a clockwise direction from Side 1, as per the Incident Command System. In the event that the incident is sectorised then the incident command system should be considered as required.

It would thus be possible to have a Side 2 in Sector 1 if the incident only had two sectors, as shown in the example below.



This system is for mapping purposes only and should not replace the incident command system used to sectorise an incident.

If the interior of the structure needs to be sectorised, then a logical and effective solution should be considered that conforms to the incident command system.

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### Identification of Areas of Search

Once a survey team has carried out an external survey of the incident it can identify each area of search.

An area of search could be defined as a point at an incident that may include casualty locations, access points or areas confirmed clear of casualties. For the majority of cases it is considered that the area of search may be a sub location within a sector, or it may be a location in its own right, clear from any other operational sectors.

This area should then be given an individual identification number to correspond with the 'Site ID' card (SOP SSA003 - Recording and Reporting of Information). The number should then be indelibly marked adjacent to this area for permanent reference. Where possible a GPS position should be taken and entered on the top of the card, with any additional information to help the USAR team to identify and locate this area. This information should be passed to the incident commander via radio at the earliest opportunity, to assist with the formation of the incident/search planning.

Where a team is not immediately deployed to search this area, or it is left unattended the ID card should be attached in a convenient position to the search area. This is for the responding team to consult before commencing search and rescue operations.

The survey team should then move on to the next area and repeat the process.

A casualty's potential location address might therefore read as follows:

Casualty A Located at Site 143 Sector 1 Inc No 12542 193 The High Street Anytown
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Any additional relevant information should be added.

### Global Positioning System (GPS)

The use of a Global Positioning System (GPS) should be considered in the planning and mapping of an incident to assist with the following:-

- Aid to navigation i.e. finding a compass bearing or 10 figure grid reference
- Way marking (marking a route)
- Recording and locating points of interest or safety critical areas
- Mapping an area with audible alert for boundaries
- Pre-planning i.e. using the GPS to locate and record specific points of a building (corners, stairwells, entrances)
- Marking points of importance at larger transport incidents

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### Other Mapping Considerations

In order to assist with the mapping and surveying of an incident the following may also be considered:-

- Local mapping capabilities i.e. mapping and planning facilities available from the host brigade, local authority emergency planners, other agencies or Police Forces.
- Consider commercially available and internet based software companies – these may be able to provide thorough, full size and colour printouts and zones of an incident. In addition it is now possible to get near real time, full resolution, satellite imagery of an area within the UK and abroad.
- Camera use – to assist in highlighting specific and safety critical features on a map or in the briefing of crews.

### Equipment Requirements

The following list of equipment though by no means exhaustive would be available in the relative early stages of an incident and should be considered by the mapping and survey team to help assist them accurately record the necessary information:-

- Graph paper (A3 and A4)
- Pens, pencils, rubbers, highlighters
- Rulers
- Clip boards
- Post it notes
- Marking board and dry wipe markers
- Digital camera
- Printer
- Tripod
- GPS
- Binoculars
- Cable avoidance tool
- Compass
- Barrier/hazard tape
- Orange marking spray paint

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**Conclusion**

The mapping of an incident can be as extensive as required but above all a map should be as timely and as accurate as possible. Information provided in the early stages should allow the incident commander to quickly assess the scope and extent of the operations allowing them to order the necessary resources as early as possible. Once time allows and further information becomes available then with more maps and plans the IC and rescue personnel will be able to apportion the work loads effectively to allow the most effective response in releasing casualties.

In all these areas effective mapping and planning can be crucial in allowing a USAR response to be delivered. It must be remembered however that the information displayed should be simple, not overcomplicated and relevant to the scene.

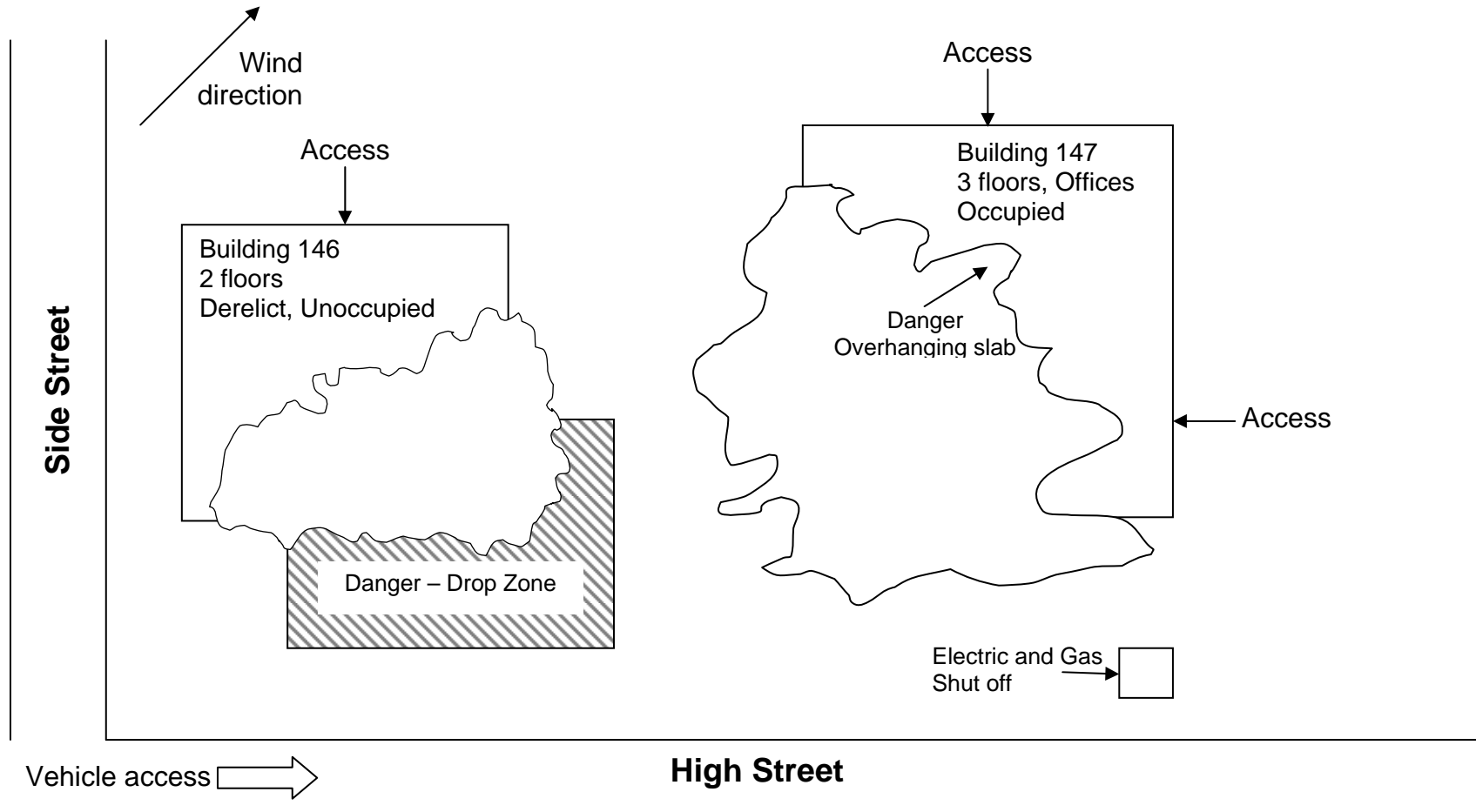
**References**

Fire Service Manual – Incident Command

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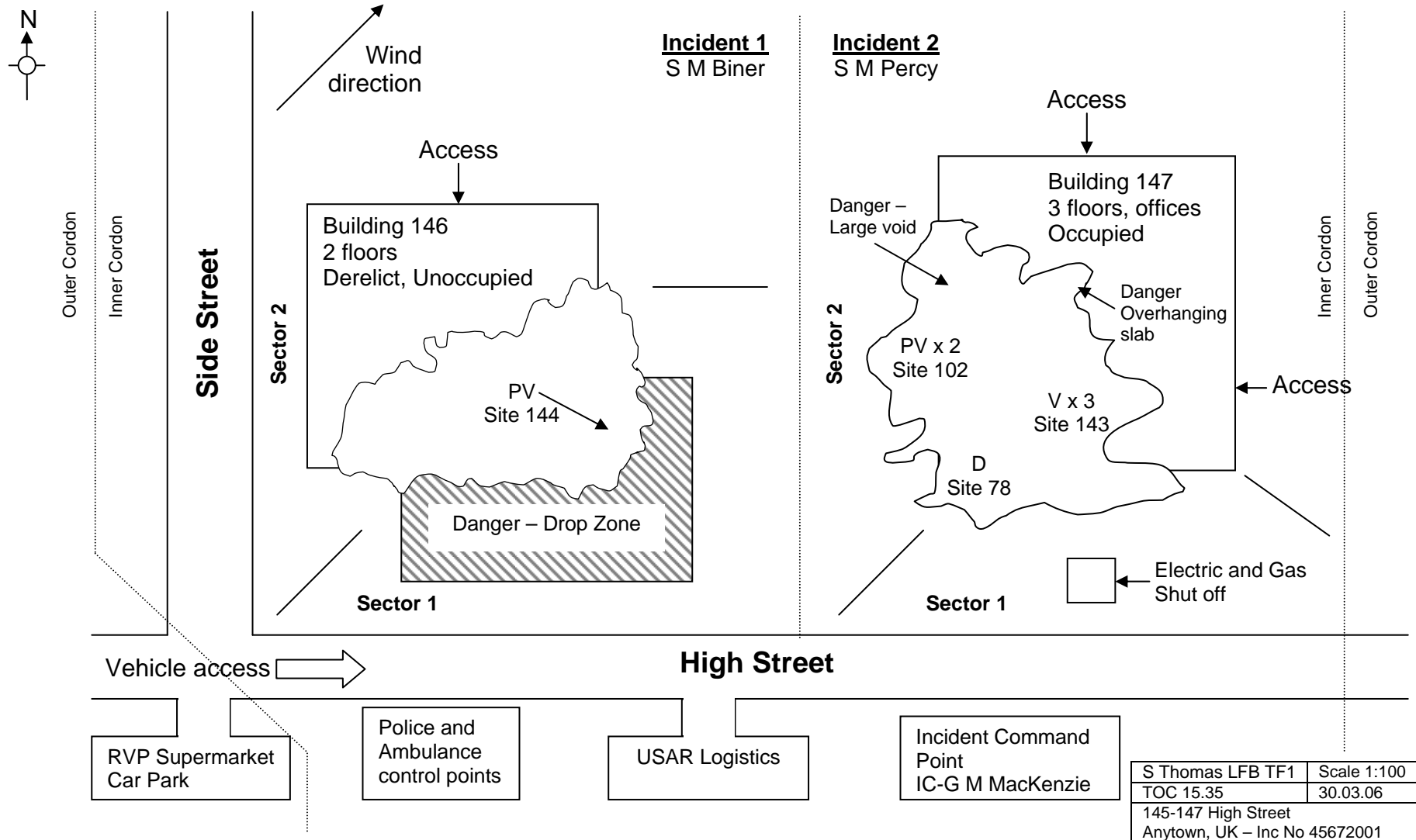
**Appendix 1 – Simple Plan**



Incident  
Command Point

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Appendix 2 – Full Plan



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