Chapter Nine:

PREPARATIONAL WORK

WHAT IS NEEDED IN PREPARATION FOR THE AUTOMATION OR INSTALLATION OF THE SYSTEM (In its Chosen location)

Tools All tools used during any works should be suitable and fit-for-purpose with any safety testing undertaken so as to meet safe contractor guidelines and the H&SE requirements.

Site Hazards Care and precaution must be taken for the safety of everyone throughout any works on site. Open trenches and foundations as well as any area of concern must be adequately protected from any personal injury or damage to property.

All dangerous hazards must be identified and the safe protection of persons catered for adequately throughout the project. Water, Gas, Electric and similar supplies must be eliminated from injury risk as required by the H&SE safe working practices.

Plans of services layout may be obtained, but assumptions as to the correct and safe whereabouts of all services must not be relied upon and test equipment (CAT scanning or other suitable approved) used in every case to confirm safe excavation throughout.

Before site excavation begins, the location and direction of all services must be clearly marked out (on the surface) and turned off, where they may fall within 500mm of the planned excavation or effects thereof.

At all times, intermittent scanning of the working area should be carried out until the excavation is completed. Services found, should be approached carefully and exposed from the side, not from above.

Civil works Civil or ground work should be carried out in accordance with local authority approval and guidelines where reasonably practical to do so, with the finish completed to a state equal or better than had existed beforehand.

Scanning and all health & safety disciplines need to be followed throughout.

All waste must be removed under appropriate license and disposed of in accordance with regulations and approvals.

Any plant and machinery used must be suitable and fit for purpose at all times, with adequate protection and safety to all catered for accordingly.



Ground levels 'Ground levels' have a direct effect upon the success of any system's design and its performance. 'Flat' ground throughout is the ideal, however 'Rising', 'Falling', 'Sloping side to side', 'Cambering' and 'Uneven' are all types of surface conditions that require special attention.

Levels that rise, or fall or both, through opening & closing may cause concern. As vehicles travel through the opening, ground clearance to the underside of each changes. This should be a consideration in the system design.

Gravity and natural forces are a major consideration when designing the physical element (gates & supports) and need to be identified as so when using manually or should the control mechanism fail. Rising hinges or tracks running up or down should be avoided.



Sliding gates and gates using offset geometry are of real concern when levels are an obstacle. Landscaping where able, to ensure the gate travels over level ground (ramps or gullies are

usually a solution for this). Offset geometry gate leaves should be counterbalanced so that gravity assistance in the downward direction is neutralized for both manual as well as automatic use.

Often with swing gates, the closed position under gate gap is required to be reasonably low (10-75mm and less at the point of a center stop). This will have an additional effect on ground clearance for vehicles and should be allowed for within the design. It is not unusual for ground movement throughout the year to vary ground levels and in such cases, additional work may be required to minimize any negative effect on system performance.

Drive surface Stable drive surfaces are important for a number of reasons as they often carry some of the control equipment that can be sensitive to damage or movement.

Loose drive surfaces such as pea shingle, unmade roads and suspect foundations are to be carefully considered. If the sub base is sound then the surface material should be more suitable, unless the driveway is on a slope! With sloping drives and a loose surface, low sloping ramps, or rumble strips similar to a ‘sleeping policeman’ can be installed, under the gates closed position and elsewhere, so as to help prevent the surface material from washing away, or being dragged down the drive.

Loose drive surfaces may well require higher levels of maintenance and this is often the case where under gate gaps can cause an issue and the surface is reduced or becomes an obstruction to the gate. Stones catching a gate leaf can stop the gate in either direction affecting the performance of the system.

A poor sub-base is to be avoided and is more likely to be affected by ground swell during flood or heavy frost, with drive movement (expansion or contraction) often hindering the performance of the system.

The thickness and type of the surface material can have a direct effect on some control equipment’s performance and sensitivity. This is important as it will relate to a number of areas including reliability, safety, and security, as well as convenience.

Heated driveways and other external influences such as buried high voltage supplies and radio interference etc. that could have an effect on system operation, if located within or near the system, should be identified and accounted for within the final system design.

The type of driveway finish may also have an effect on the products used as well as the physical build of the system and should be considered/agreed. This is highlighted where safety response from a moving obstruction may be adversely affected (Example; a slippery surface with loop safety location/positioning).



Landscaping Any landscaping of an entrance or its surroundings should be planned and built with full regard to the automatic system that is, or is to be installed. The consequences arising for both the operation of the system and the user's requirements should be fully accounted for as well as any other environmental considerations that could affect the system's performance.



Cable runs Electrical standards and good design practice must be applied to the gates power supply, similarly the control systems wiring including low voltage cabling. Where there is an inheritance of any existing cables these should be properly tested, because if faulty, or poorly installed, they could cause injury either directly or indirectly from the system or associated/connected equipment.


Power supply cable runs and terminations must adhere to the latest approved standards.

Mains supply power should be a dedicated supply limited to the entrance system itself and not shared with other systems such as lighting, and is to be adequately protected both mechanically and electrically.

Local and accessible (to engineers, not for free public use) isolation of the mains power supply is to be made at both source and system.

All cable runs should be planned and installed using suitable externally rated cables of adequate core dimension (with spare cores where possible), together with suitable and durable fixings, glands and connectors.

Ducting should be of a suitable size and type. 'Flexible Anti-crush type' with sweep bends, no elbows and adequate access for servicing, with suitable draw cords.

Trenched cables should be buried at an adequate depth with suitable cable tape and appropriate markings.

Surface fixed, conduited or tray fixed cables should be fully fit for purpose, installed to current standards and with adequate mechanical as well as electrical protection.

A plan of all cable routes should be made and recorded in the technical file.

It is recommended that a common colour code be adopted across all systems that have similar equipment and or controls so as to achieve recognized conformity between sites (E.g. the radio receiver unit C1 wires back to the control panel using the same colour cores each time, or the safety photo-switches S1 being wired in similar colour cores on all systems installed by the same company).

Support structures The support structure of every system, whether it be a gate post/pier or barrier stand, is one of the most important parts of the system. Its stability directly affects the performance and reliability of the system.

Leaning, cracked, rotten, damaged or bent posts/piers may cause the gate to fail as will inadequate fixing or foundation.

Integrity of support is not just for the hanging of the gate itself but must allow for a reasonable safety factor, in a likely abusive situation. Children climbing or swinging on a gate is always likely, as well as minor vehicular impacts!

Alignment of supports is equally as important, so the fixing, foundation and surrounding base material are all details that require consideration. It is reasonably common place (on existing systems) for one support to be out of alignment with the other, for numerous reasons.

Suitable and adequate foundation is required for each support and often, deeper foundations, a link beam, or diagonal support may be needed to ensure long term stability.

Foundation depth for a domestic system gate support, is recommended at 1m +/- subject to location and for multi-user or light commercial at 1.2/1.5m +/- subject to location.



Link beams are used to fix support posts together under-ground (above or below duct level, beyond base and finish) and most commonly across the drive, where the terrain may be suspect. New build on rural locations, or drop offs close to the entrance are typical conditions. Landfill and new or unmade roadways can be less stable over the course of time as well as water table effects and terrain/surfaces that react poorly in extreme weather conditions.


Diagonal brace supports or spread beams are used when a link beam is not practical or sufficient. Their aim is to spread the loads from the gate and ensure system stability throughout.


Piers and columns are usually inadequate as support alone due to their inherent weakness during impact or force and suitable steel support, either within or external, should be provided.

Steel posts are the ideal form of support as they provide numerous technical benefits as well as cosmetic and maintenance/repair advantages. Welding fixings to steel rather than plating and fixing to weaker masonry is an obvious one.

Steel posts also allow hidden and serviceable cabling and fixings for equipment.

The shape of the support structure should not allow un-necessary trap points between itself and the gate hanging from it.

The position and location of every support together with the gate hinge/fixings and operator used, will affect the potential opening angle of the system as well as other areas of possible entrapment and should be designed accordingly.

Detailed piers with stepped features look good but can create a trap point during operation of the system. Steels between the piers, much like the border around a picture, often provide the technical benefits and allows the piers to provide the cosmetic requirement with reduced safety risk.

Existing support structures can often look ideal but investigation is needed as they were probably not built for automation and as such compromises may be evident. New pointing on old piers is one disguise that can cause piers to fail and in some cases become unsafe. Walls that have stood for years can be weakened by the constant use of automatic gates, wind battering or un-reported abuse.



Existing gates Modifications to existing gates are necessary for the long term reliability of the system and need to be carried out so as to achieve satisfactory performance and safe operation throughout the life of the system.



Building works Local building work affecting the gate installation should be carried out with all the needs of the system considered.

Relationships between the building works and system installation are greater than may be first assumed and good planning for each, is advised.

To avoid site damage, it is often recommended that the gate installation work is programmed towards, or at the end of a project, after heavy vehicular access or deliveries have finished.

Some system components may need to be fixed into, on, or adjacent to, associated structures or within the drive surface, etc. Good liaison between all parties is important for a successful finished product that can be suitably maintained.