



## 6-20.1 Layout

When laying out sewer structures, it should be noted that the center of the sewer is not necessarily the center of the top opening in the structure. Adjustments in the layout may have to be made to ensure proper location of the frame on the structure.

Special care must be taken in the layout process to ensure location and elevation are correct. The contractor and engineer should agree on the method of staking and marking drainage facilities before start-up of survey activity.

## 6-20.2 Materials

Mortar may be composed of three parts sand for mortar and one part 50% portland cement/50% masonry cement mixture, or three parts sand for mortar and one part 75% portland cement/25% hydrated lime mixture as set forth in [standard spec 519.2.3](#).

Sand for mortar must meet requirements of [standard spec 518.2.2](#).

Concrete brick and block masonry units must conform to the requirements of [standard spec 519.2.2](#). The maximum water absorption is not to exceed 6% by weight.

Some masonry plants add a color to differentiate brick or block meeting our requirements.

## 6-20.3 Construction

All masonry units should be wetted before use to allow the mortar to stick and to prevent quick setting of the mortar.

Observations of manhole, inlet, and catch basin structures of various ages have disclosed numerous cases where the covers have settled below the adjacent pavement or gutter, and investigation has revealed the materials used to support and adjust the cover have deteriorated to the extent the materials could either be removed by hand or had already fallen into the structure. This is typically the result of the improper methods used in setting or adjusting the covers when they were installed.

Covers are often observed temporarily supported on a variety of shims or wedges while the adjacent concrete is being placed. Later, a cosmetic layer of mortar is applied from the inside of the structure with little, if any, mortar getting under the flange of the casting. This practice of adjusting the masonry structure to near the final grade, supporting the covers on small wedges or whatever while placing the adjacent concrete, then later attempting to force mortar under the flange, has proven unsatisfactory and will not be permitted.

The practice of boxing out covers and then placing adjacent concrete promotes random cracking and will not be permitted.

The following construction practices are recommended:

- Whenever possible, the covers should be adjusted and set to grade on a full bed of mortar in advance of the paving operation or curb and gutter placement.
- In the case of inlet covers where slip-form methods of curb and gutter placement are utilized, the frames can be preset approximately one inch low, the curb box removed, and the slip-form operation run continuously through the inlet location. Later, the curb section can be shoveled out, the curb box replaced, and the concrete patched in by hand on either side. The gutter section can be worked down to the frame elevation within a short distance on either side of the inlet.
- In the case of a manhole cover in the pavement (slip-form operation), or any other case where the fixture cannot be set before the placement of the adjacent concrete, the structure should be covered with a temporary cover such as a steel plate, the location carefully noted, and the concrete placed over the structure. When the paving operation has passed, the concrete over the structure can be shoveled out, the plate removed, and the cover placed and supported on the structure in such a way that an opening exists between the top of the structure and the bottom of the flange. The subgrade around the fixture should be sloped down to the top of the structure on about a two-to-one slope so as to allow concrete to flow into the opening under the flange. A form must be placed inside the structure to retain the concrete. As the concrete is placed adjacent to the cover it should be carefully spaded and vibrated to force it under the flange. All remaining voids are to be pressure grouted with nonshrink grout before opening the highway to traffic.

Curing usually is not required for brick or concrete block masonry; however, the curing requirements are necessary when the manhole or inlet is constructed with concrete masonry.

#### **6-20.4 Acceptance and Records**

An inspection should be made of the interior of all manholes and inlets before final acceptance. Any voids between the flange and the top of the structure should be filled by the contractor.

Before final inspection and acceptance, all new, reconstructed or existing storm sewers, catch basins, manholes, inlets, or other drainage structures are to be cleaned by the general contractor of debris that has accumulated as a result of work operations under the contract.

Records of final locations, elevations, and unusual ground conditions should be inked on the as-built plan for future reference.