

# T.C. WILLIAMS HIGH SCHOOL

ALEXANDRIA, VA



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**STRUCTURAL OPTION**

**ARCHITECTURAL BREADTH**

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## ARCHITECTURAL BREADTH

An architectural study will be undertaken, evaluating the effects of adding two additional stories. Adding stories will have an effect on the previously designed architectural design, and considerations will need to be made to best account for the additional stories. Adding height and possibly a small amount of volume will impact the MEP sizes, locations, and main distribution ducts, as well as impact the floor plan for column sizes.

### FLOOR PLANS

With the addition of two floors to the building, the architectural floor plans would obviously have to change. During the redesign of the plans, special consideration was made to keep certain groups of rooms together. For instance, all faculty offices, and guidance centers were kept towards the lower half of the classroom wings, on the first 3 floors. Other rooms such as the television studio, was kept close to the television production, workroom, and editing rooms. Normal classrooms are located on the third floor and up. In order to account for proper egress, stairways remained in their normal positioning. The restrooms were also stacked for ease of construction and simplicity.

Another design consideration was the stacking of shear walls. It's critical that at least two or three walls stack all the way up the building. These walls will be used to resist the lateral forces on the building.

### ROOF PLAN

With the classroom wings getting thinner, a problem with the mechanical systems on the roof arises. Originally these mechanical systems were hidden from site, and were placed in between the two clearstories on the roof. The clearstories used to each reside over the two corridors. When the building was made thinner, one corridor was removed, and with it, one clearstory. Without any further changes, these mechanical systems would be visible from the ground. It was decided to create a new roof system that would hide the mechanical systems from site, from ground level. A sloped roof was designed to cover up the mechanical systems. On the roof is a standing seam metal roof that will match the other standing seam roofs on the front of the classroom wings.

These roof plan strips show the general layout of the clearstories to the mechanical systems. There is five feet of walking space between the mechanical systems and its adjacent obstacles. A section was also created to better show the relationship with the new roof.

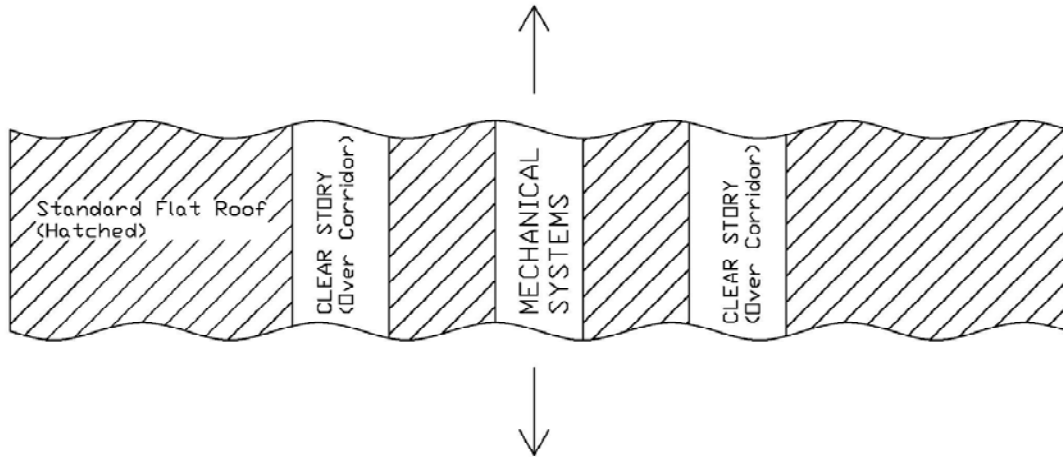


Figure 5 - Existing Roof Plan Strip

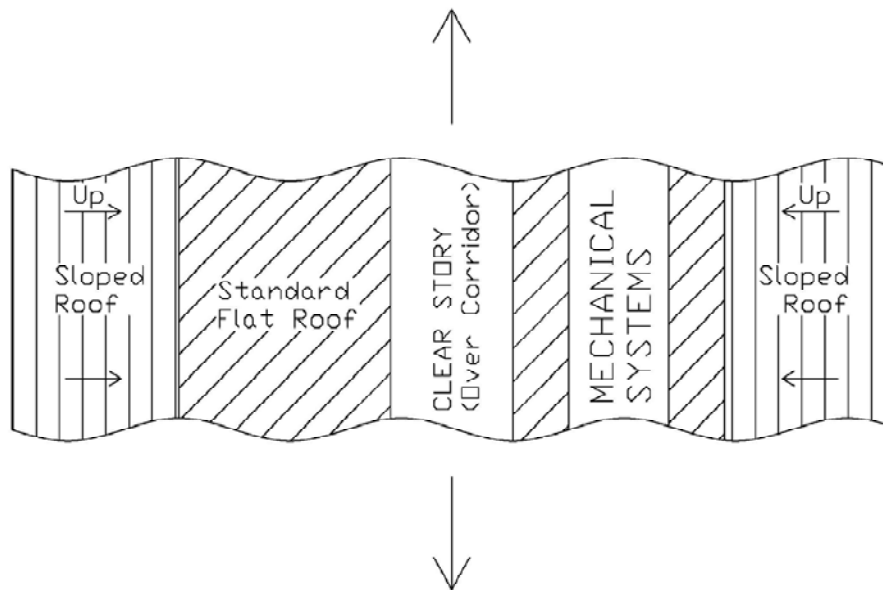


Figure 6 - New Designed Roof Plan Strip

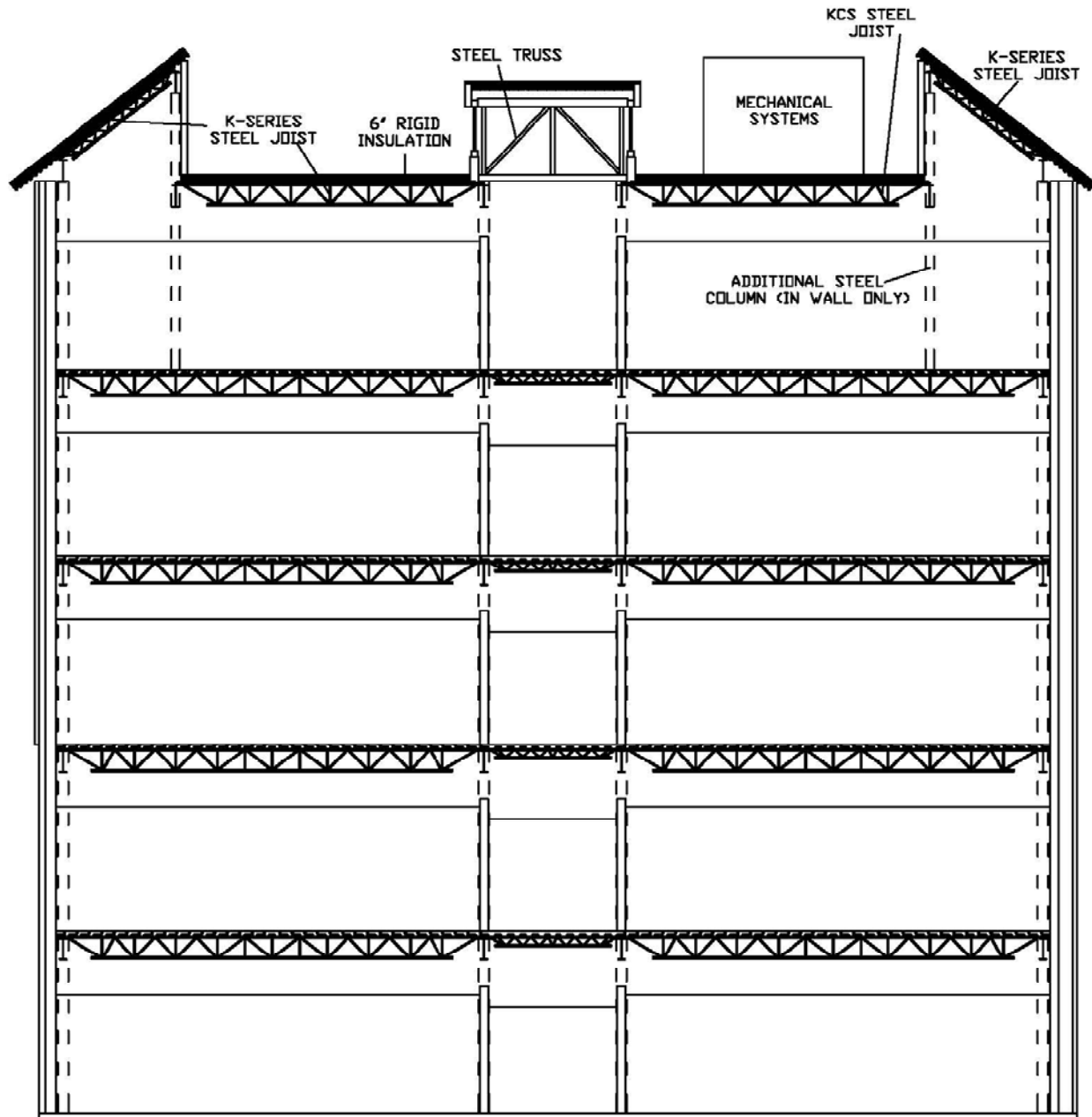


Figure 22 - Architectural Section Cut

## **STRUCTURAL SIZES**

Also seen in the section is the relation of the structural elements to the ceiling height. In all cases, special attention was paid to the depth of the structural joists. It was decided that the joists depth would not exceed that of the original girder depth. After setting the minimum joist depth I went back and made sure the mechanical equipment had enough room to clear under the joists. Further investigation may allow the mechanical equipment to pass through the steel joists, which would actually allow a decrease in floor to floor height. However without that further investigation it is uncertain whether this would be the case or not.

The structural steel W-Shaped columns, found in the classroom wings were kept 10 inches wide to match the existing columns, and placement did not change. Additionally, the additional columns added to support the new roofing system are all found in interior partitions, so they do not affect the current floor plan.

## **ADDITIONAL ARCHITECTURAL FEATURES**

Considering the school as a whole, there were originally 70% of rooms with an outside view. Just considering the classroom wings of the building, only 67% of these rooms had an outside view. However with the redesign, 91% of these rooms will receive natural light. This is a significant increase, and large advantage of a redesign.

The exterior façade will not change, except for its height. The additional 30 feet of height will be the same window to wall pattern as the wall below it. The building was also inspected for massing purposes, to see how the new shape would affect the rest of the building.