# CAMPUS ROAD DESIGN

Thesis for the Degree of B. S.
MICHIGAN STATE COLLEGE
T. B. Simon
1942

# CAMPUS ROAD DESIGN

A Thesis Submitted to

The Faculty of

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of

AGRICULTURE AND APPLIED SCIENCE

by

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Candidate for the Degree of Bachelor of Science

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## ACKNOWLEDGMENT

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## INTRODUCTION & PURPOSE

Among one of the problems on the Campus is the congestion of traffic and the need for parking area near the Judging Pavilion during Farmers Week, and whenever the building is used by the Stock Judgers Association.

The purpose of this thesis is to provide a plan and proposal eliminating the conditions existing at the Judging Pavilion.

During the present National Emergency it is practically impossible to obtain steel reinforcing bars, therefore the slab and curb will be designed without steel. The plan will be designed so as to conform to the landscaping scheme of the rest of the Campus.

## THE SURVEY

The usual preliminary survey of the area involved, and the surrounding area was made using a transit and tape. Centerline stations were established and data on the profile, along with topographic features of the area were recorded in a field book. Since the fill sand for the project was placed last year, cross sectioning was deemed unnecessary.

After the field work was done, the field notes were plotted to scale. Data on the existing drainage system was obtained from the Buildings and Grounds Engineering Division.

Looking west from Sta. 0+00

Looking West from Sta. 6+00

Looking east from Sta. 6+00

Looking east from Sta. 10+55

## DESIGN PROCEDURE

After plotting the data obtained in the survey, several tentative plans were sketched. The proposed plan was adopted after careful study, and consideration of the engineering problems involved in the project.

Since the intersection of the new pavement with the existing pavement forms a Y intersection; it was deemed feasible that the new grade from station 6+50 up to the intersection be similar, as near as possible, to the grade of the existing pavement. The proposed grade was approved by T.G. Phillips, Landscape Architect, and was consequently adopted.

The parking area as shown on the plan, was designed to accomodate approximately 130 cars.

The curbing and slab was designed without the use of steel reinforcing bars. Ordinarily the most economical designs involve the use of dowels at tranverse expansion or construction joints. As was stated in the introduction there is a shortage of steel, therefore it was necessary to strengthen the joints by increasing the thickness of the concrete at the joints and gradually tapering back to the regular slab thickness. The formula

$$d = \frac{2.4\ W\ c}{S}$$

was used in determing the thickness, where

d = depth in inches

c = coefficient of subgrade support

S = the allowable working stress

W = 11,000 #

c = 1.0 equivalent to a bearing power of 10# per sq. inch

S = $\frac{\text{Modulus of Rupture of Concrete}}{\text{Safety Factor}}$

700# per sq. inch
2

W may vary from 6,000 to 11,000 lbs. Since the road will be occasionally be used by heavy stock trucks, and to be conservative the value 11,000, was used for W.

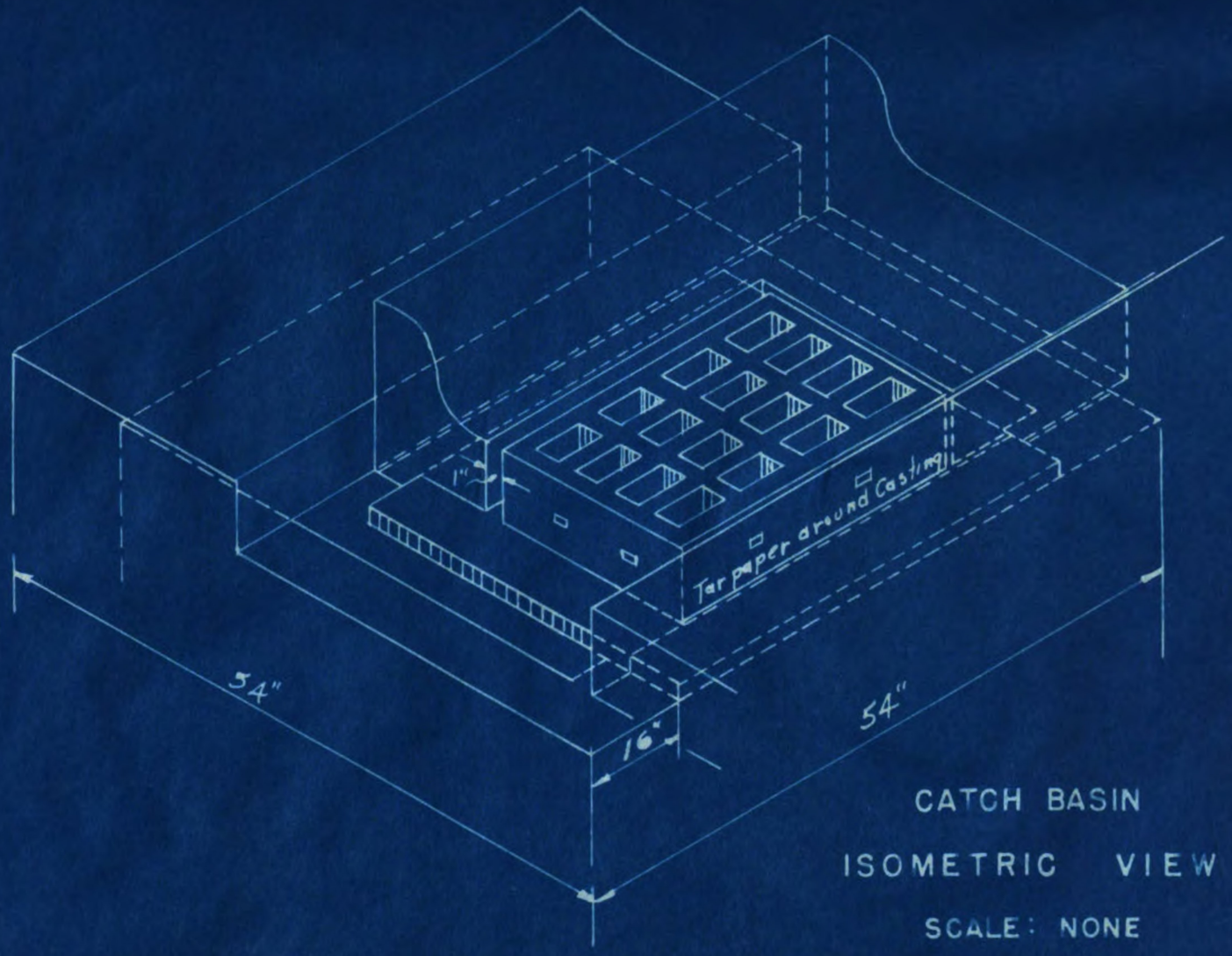
The above formula and data was obtained from the Portland Cement Association.

Although the existing type of curbing on the Campus, contains steel reinforcement, the new curbing and slab, without steel, will be similar in appearance, to the existing curbing.

After studying the data on existing drainage system, obtained from the Buildings and Grounds

Engineering Division, only one new catch basin was deemed necessary.

The widening of the intersections as shown on the plan is to facilitate widening and adding curbing to entire road, when funds become available to widen the road to a 30 foot width.



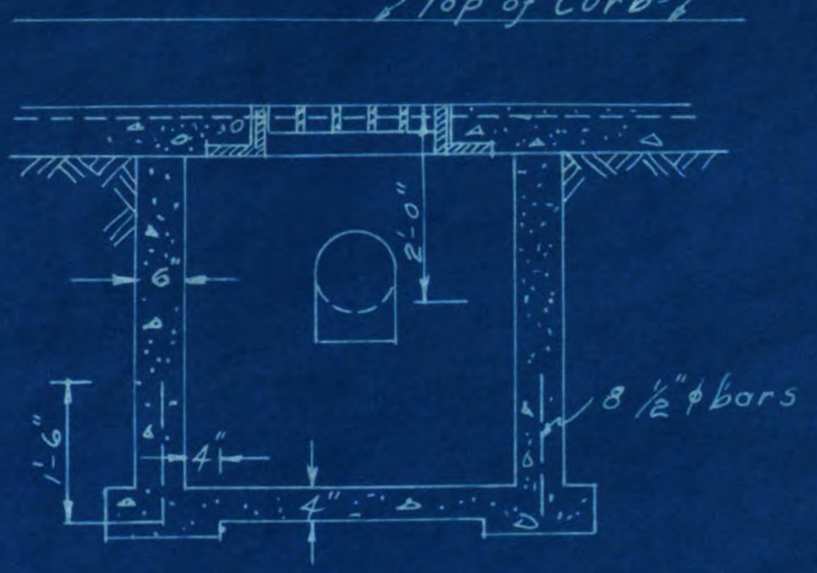

CATCH BASIN

ISOMETRIC VIEW

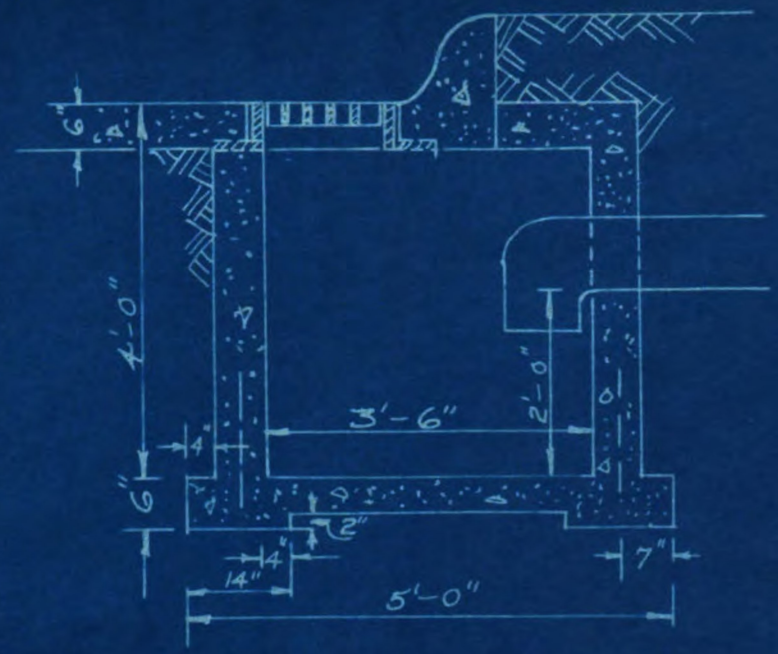
SCALE: NONE

# CATCH BASIN

SCALE : 1" = 2'-0"




TRANSVERSE SECTION




LONGITUDINAL SECTION

# ESTIMATE OF QUANTITIES

| ITEM | QUANTITY |
|---|---|
| Removal of 4"to 8" trees | 4 |
| Sand fill (parking area) | 2260 CY |
| Cinder fill | 1680 CY |
| Trimming & finishing earth grade | 13 sta. |
| Finishing cinder fill | 5400 SY |
| Concrete | 485 CY |
| Catch basins | 1 |
| 6" tile | 200 LF |
| Seeding | 5200 SY |
| Stop Rail Lumber | 1600 BF |

## CONCLUSION

Although the site of the proposed plan is separated from the main Campus by the Red Cedar River, every effort was made to have the plan conform to the unique layout scheme of the main Campus, because eventually as the College expands the surrounding area will be used for building sites, and the buildings will probably be used for research and classwork.

If in the future, funds are available the proposed cinder road and parking lot can be paved with a minimum amount of earthwork.

Pocket has: 1 Map