

A DESIGN AND COST ESTIMATE
OF A TRAILER COACH PARK

Thesis for the Degree of B. S.
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Malcolm H. Cooper, Jr.
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THESIS

A Design and Cost Estimate
of A Trailer Coach Park

A Thesis Submitted to
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by

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Preface

The purpose of this thesis is to formulate the ideal design for a trailer coach park which will accommodate one hundred trailers, making all facilities as convenient and as economical as possible with the least expenditure for maintenance. The design of any trailer park or court is based upon the bill passed by the Legislature of Michigan in the year of 1941. There is in the following pages a copy of this law which regulates all the trailer coach parks in this State.

The information that is used for the trailer camp design was taken from a general study of camps through out Michigan and from actual contact with the one that is now in operation on the same tract as that of the camp proposed in this thesis.

Design Features of Building

All the electric wiring, plumbing, and drainage, and the sewage system will, of course, comply with the State of Michigan codes and the rules and regulations set by the State Health Department of Michigan.

The building is a one-story, cinder block construction including a basement. It is necessary to have a basement so that all plumbing can be in the open, and the problem of maintenance will be more simple and installation more economical. For the main floor steel joists were used with a concrete floor over hy-rib lath.

There are individual shower rooms, including lavatory, water closet, and shower head, eight in number apiece for both men and women. In using this arrangement, a person taking a shower takes out of use, at the same time, a lavatory and water closet. For this reason more lavatories and water closets are necessary than are required by State regulations. However, the added convenience and increased privacy to the individual warrants the increased expenditure over the group arrangement of shower stalls and lavatories and water closets. The partitions are of 2x4 metal lath and are plastered. In each shower room there is to be a register to increase ventilation and to facilitate heating. The showers that are used in this plan are a standard metal shower with a composition floor that may be obtained ready for application. In this way an extra shower can always be ready to replace another which needs refinishing. This also reduces the cost of maintenance.

The interior plastering is two coat work with a smooth finish of Keen's cement. By use of Keen's cement the danger of the plaster drawing dampness is less and the smooth finish is easier to clean.

The roof is supported by an "I" beam and has wood rafters and sheathing with three ply felt and gravel roofing. The felt used shall not be less than 15# per square for each ply.

The hot water is furnished by a horizontal gas-fired heater with a capacity of a 150-gallon per hour recovery. This hot water supply is not meant for use in the individual trailers. People take advantage of such a provision with a resulting loss of hot water, putting an added burden on both water supply and gas heater. For this reason the hot water will be for lavatories, showers, and laundry only, the needs of which the named equipment can easily and abundantly handle.

The heating system used will be of the steam-vapor type with a gas-fired boiler. In using this means of heating, the time of firing is saved and heating compartment is kept much cleaner than with a regular coal furnace. At the same time the room required for equipment is reduced to a minimum.

Design Features of the Camp

Each individual space is to be 20 x 35 feet and arranged so that all trailers will be backed into the lot and room will be left for parking a car in front of each trailer. In figuring the cost of the camp only the rough grading is considered. All seeding and planting of trees and shrubs will be left to the management of the camp.

All trailer sites shall have a sewer connection that will be trapped. This is required in the state law of Michigan. The sewers are to have a velocity of at least 2 ft. per second. All waste from trailers and service building will enter into a septic tank, 8 ft. wide by 30 ft. long and 5 ft. deep, having a 9,000 gallon capacity. There is also provided means of a manually operated gate, controlling two lines to separate disposal fields. This permits the alternate use of fields, letting one rest while the other is being used. According to the State Health Department of Michigan, with a septic tank of this large a capacity it is not necessary to have a means of siphonage in this plan.

All roads in the camp shall be 22 ft. wide. In the last two years the length of the trailer has been increased to as long as thirty feet. Therefore more room is necessary for parking them. The roads are to be surfaced with a good grade of road gravel at least one inch slope per foot of width in order to form gutters.

The Wiring of the Camp

For the wiring in the camp it will be necessary to use a three wire 200 amp. service. There will be three main lines joined to form a loop. This will guarantee an equalized load for each line and the voltage drop from any one of the three lines will be compensated by the other two.

The lines shall be #6 weather-proof wire, strung on poles 22 ft. long. The wires shall not be lower than fifteen feet above the ground. In the lay-out of the park, provision has been made for each trailer to have a separate meter. These meters shall be at least of 5 amp. capacity, which will stand a load of 15 amps. The meters are to be enclosed in a three and four gang metal meter box, and each meter is to be fused separately.

For anyone to attempt to run a camp without having trailers metered separately (i.e. by use of an assumed average use of electricity per trailer and a charge made on this basis) is unfair to both residents of the camp and to the proprietor. There is no average that can possibly satisfy everyone. If the electricity is furnished or included in the rent, the average person will not conserve as he does if there is a charge in proportion to the amount he uses. This has been proven in the camp around which this thesis is written. Here it was found that twenty trailers without meters will use as much electricity as sixty trailers with meters. Therefore meters insure the trailerite against an excessive charge for electricity and protects the proprietor against excessive and wasteful use of it. While the expense of buying and in-

stalling the meters is great at first, within a short period of time they will have paid for themselves simply by acting as a control measure on the consumer.

Water Accommodations

There shall be at least four frost-proof cold water hydrants with drains for water accommodations, anyone of which are not to be farther away than one hundred feet from any trailer.

STATE OF MICHIGAN
61ST LEGISLATURE
REGULAR SESSION OF 1941

ACT NO. 255, PUB. ACTS 1941

AN ACT to amend the title and sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 and 12 of Act No. 143 of the Public Acts of 1939, entitled "An act to define, license and regulate the maintenance and operation of house trailer camps within the corporate limits of townships of the state of Michigan; to provide for the payment of annual and monthly license fees to the township for each trailer camp; to provide for regulation by townships and school districts under which trailer camps shall be operated; to provide for the disposition of license fees between townships and school districts, as collected; to require a surety bond for faithful compliance of the provisions of this act; and to provide penalties for the violation of this act," and to add to said act 14 new sections to stand as sections 6a, 6b, 6c, 7a, 7b, 7c, 7d, 7e, 13, 14, 15, 16, 17 and 18 thereof.

THE PEOPLE OF THE STATE OF MICHIGAN ENACT:

Section 1. The title and sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 and 12 of Act No. 143 of the Public Acts of 1939, entitled "An act to define, license and regulate the maintenance and operation of house trailer camps within the corporate limits of townships of the state of Michigan; to provide for the payment of annual and monthly license fees to

the township for each trailer camp; to provide for regulation by townships and school districts under which trailer camps shall be operated; to provide for the disposition of license fees between townships and school districts, as collected; to require a surety bond for faithful compliance of the provisions of this act; and to provide penalties for the violation of this act," are hereby amended and 14 new sections are hereby added to said act to stand as sections 6a, 6b, 6c, 7a, 7b, 7c, 7d, 7e, 13, 14, 15, 16, 17 and 18 thereof, said amended title and amended and added sections to read as follows:

TITLE

An act to promote the health, safety, and welfare of persons living in trailer coaches, on trailer coach parks within the state of Michigan; and to define, license and regulate the maintenance, operation and inspection of trailer coach parks by the state health commissioner and school districts under which trailer coach parks shall be operated; to provide for the suspension, revocation, and transfer of licenses; to provide for the payment of annual and monthly license fees to the municipality, county, and school district for each trailer coach park; to provide for the registration of all persons occupying trailer coaches in trailer coach parks; to provide for the disposition of license fees between the municipality, county, and school districts, as collected; to require a surety bond for faithful compliance of the provisions of this act; and to provide remedies and penalties

for the violation of this act.

Sec. 1. For the purpose of this act, a trailer coach is hereby defined and declared to be any vehicle used or so constructed as to permit its being used as a conveyance upon the public streets or highways and duly licensable as such, and shall include self-propelled and nonself-propelled vehicles so designed, constructed, reconstructed, or added to by means of accessories in such a manner as will permit the occupancy thereof as a dwelling or sleeping place for 1 or more persons, and having no foundation other than wheels, jacks, or skirtings when located in a duly licensed trailer coach park: PROVIDED, That such parking sites are equipped with adequate safety and sanitary facilities as herein described, and such other rules and regulations as the state health commissioner shall deem necessary to the health of the residents of trailer coach parks and immediate adjacent communities.

Sec. 2. For the purpose of this act, a trailer coach park is hereby defined and declared to be any site, lot, field, or tract of land upon which 3 or more occupied trailer coaches are harbored either free of charge, or for revenue purposes, and shall include any building, structure, tent, vehicle, or enclosure used or intended for use as a part of the equipment of such trailer coach park.

Sec. 3. No person, firm, or corporation shall establish, maintain, conduct, or operate a trailer coach park within the state of Michigan without first obtaining a

license therefor from the state health commissioner. Such license or licenses shall be issued for 1 year, and shall expire at midnight on the thirtieth day of September next following the issuance thereof.

When a trailer coach park is located in more than 1 municipality it shall be dealt with as 2 separate trailer coach parks.

Each trailer coach park shall have a setarate license.

All applications for a permit to construct or make alterations upon a trailer coach park and the appurtenances thereto, and a license to operate and maintain the same, shall be made to the state health commissioner, when said trailer coach park is to be located within the city limits of a city having an organized board of health, or in a county having a county health officer, the application shall be made to the state health commissioner through the city board of health, if located within the limits of a city; through the county health officer if located outside the limits of a city.

Sec. 4. Before any such license shall issue, the applicant shall file with the state health commissioner a written application for such license, setting forth:

(a) The full name and address of the applicant or applicants, or names and addresses of the partners if the applicant is a partnership, or the names and address of the officers if the applicant is a corporation, and present or last occupation of the applicant at time of the filing application.

(b) A legal description of the site, lot field, or tract of land upon which it is proposed to operate and maintain a trailer coach park.

(c) The proposed and existing facilities on and about said site, lot, field, or tract of land for the proposed construction or alteration and maintaining of a sanitary community building for toilets, urinals, sinks, wash basins, slopsinks, and showers, drains, laundry facilities, source of water supply; sewage, garbage and waste disposal; and method of fire protection, as in this act provided.

(d) The proposed method of lighting the structures and site, lot, field, and tract of land upon which said trailer coach park is to be located.

(e) Designate the calendar months of the year which applicant will operate said trailer coach park.

(f) The applicant shall furnish plot plans in detail and number of the land to be used as a trailer coach park, and building plans and specifications of existing buildings, buildings to be constructed or altered, together with all facilities, as may be required by the rules and regulations promulgated by the state health commissioner for the purposes of this act.

(g) Name of county of which applicant is a citizen.

(h) The affidavit of the applicant as to the truth of the application.

When municipal water and sewer systems are not available, plans and specifications for proposed private water

supply and sewage disposal systems must be submitted to the state health commissioner for approval and issuance of a construction permit before construction is started.

All buildings constructed or altered, all plumbing, electrical and heating installations shall be in accordance with existing applicable codes.

If the application for a permit to construct or make alterations, upon a trailer coach park and the appurtenances thereto or a license to operate and maintain the same is declined by the state health commissioner, he shall so state in writing giving the reason or reasons for declining the application. If the objections can be corrected the applicant may amend his application and resubmit it for approval, and if denied the applicant may appeal de novo from the decision of the state health commissioner to the circuit court in chancery in the county in which said trailer coach park is located.

Sec. 5. Upon presenting his application, together with all plans and specifications hereinbefore enumerated or prescribed by the state board commissioner, the applicant shall pay to the person authorized to accept his application a license fee equal to \$25.00 for each 10 acres, or fraction thereof, of land to be used as a site, lot, field, or tract of land upon which a trailer coach park will be constructed or altered, operated and maintained and take a receipt therefor.

When the application has been approved, the state health commissioner shall issue a permit to the applicant to construct or make alterations upon trailer coach park and the appurtenances

thereto according to the plans and specifications presented with the approved application.

When the applicant has completed the trailer coach park and the appurtenances thereto, he shall so notify the state health commissioner through the city board of health if the trailer coach park is located within the limits of a city having an organized board of health or through the county health officer if said trailer coach park is located outside the limits of a city in a county which has a county health officer; then the state health commissioner shall inspect or cause to be inspected by a duly authorized representative, the trailer coach park and the appurtenances thereto, and if completed according to the accepted application the state health commissioner shall issue in the name of the people of the state of Michigan a license to operate and maintain such trailer coach park.

No change or alteration in any building or enclosure, situate within the limits of a trailer coach park; no change in any sanitary or safety facilities; no change in drainage sewer; no change in methods of water supply, sewer, garbage or waste disposal; no change in the plot plan shall be made without first making a written application to the state health commissioner and receiving a written permit therefrom. Syeg application shall be made in the way and manner hereinbefore set forth; such change or changes shall comply with such safety and sanitary code, codes, rules and regulations as are applicable thereto.

No approval of plans and specifications and the issuance of a permit to construct or make alterations upon a trailer coach park and the appurtenances thereto by the state health commissioner shall be construed as having been approved for other than sanitation. Such a permit does not relieve the applicant from securing building permits in municipalities having a building code; or from complying with other municipal ordinance or ordinances, applicable thereto, not in conflict with this statute.

Annual license fees collected by the city board of health or county health officer shall be deposited by the health officer with the treasurer of the board of health, and he shall keep such deposits in a special fund designated for use in carrying out the purposes of this act: PROVIDED, HOWEVER, that there is no municipal ordinance or regulation prohibiting a city board of health or county health officer from maintaining any such special fund; in that case, all license fees collected shall be deposited and used in accordance with the municipal ordinances and regulations. Annual license fees collected by a state health commissioner shall be deposited with the state treasurer and placed in the general fund.

Sec. 6. In addition to the license fee provided for in section 5 hereof, each licensees shall pay an additional license fee of \$1.50 per month, or major fraction thereof, for each occupied trailer coach occupying space within said trailer coach park so licensed, which additional license fee

shall be paid on or before the fifth day of each month by said licensee in the way and manner hereinafter prescribed; PROVIDED, HOWEVER, That the licensee of a trailer coach park shall not be required to pay a monthly license fee as herein provided, for any space occupied by a trailer coach accompanied by an automobile, if said trailer coach and automobile bear license plates issued by any state other than the state of Michigan, for an accumulated period not to exceed 90 days in any 12 month period: PROVIDED FURTHER, That all the occupants of said trailer coach with accompanying automobile are tourists or vacationist. When 1 or more persons occupying a trailer coach bearing a foreign license are employed within the state of Michigan, there shall be no exemption from monthly license fees.

The monthly license fees of \$1.50 for each occupied trailer coach situated upon a licensed trailer coach park shall be divided as follows: For each \$1.50 collected, 75 cents shall be credited to the school board or boards for the district or districts in which such trailer coach is parked; 50 cents to the county treasurer; 25 cents to the municipality.

It shall be the duty of the treasurer of the municipality in which trailer coach parks are located to accept and verify the monthly reports from licensees and to collect and disburse the monthly license fees as hereinafter provided: The municipal treasurer shall issue a receipt in triplicate for all moneys collected, under this act, the original for licensees, the duplicate to be retained for municipal records, the triplicate and funds, less 25 cents per trailer coach so parked,

shall be transmitted to the county treasurer; the municipal treasurer shall credit its general fund with 25 cents per trailer coach so deducted from moneys collected; the county treasurer shall credit its general fund with 50 cents for each trailer coach so parked, and shall credit the school district or districts, in which the trailer coach was parked, with 75 cents for each trailer coach so parked; the county treasurer shall issue an official receipt for all money collected: PROVIDED, HOWEVER, That if a trailer coach park be located within the limits of a city collecting its own delinquent tax, the city treasurer shall collect \$1.00 for each trailer so parked, and shall issue a receipt therefor, made in triplicate, the original for the licensee, duplicate to be retained for city records, and triplicate to be forwarded to the secretary of the board of education of the municipality. The city treasurer shall make a special account of moneys collected from licensees of trailer coach parks, and shall credit the school fund with 75 cents of each dollar so collected, and the general fund with 25 cents. When a trailer coach park is located within the limits of a city collecting its own delinquent taxes, the licensee shall make a report to the county treasurer of the county in which said city is located, of the number of occupied trailers on his trailer coach park for the preceding month or the major fraction thereof, and pay to the county treasurer 50 cents for each trailer coach so parked; the county treasurer shall accept and verify said report and collect 50 cents per month or major fraction thereof, for each occupied trailer coach so

parked within such city or cities within the county, and issue a receipt therefor in triplicate, the original for the licensee, the duplicate for the county records, and forward the triplicate to the county board of auditors, and credit the general county fund.

All payment or payments of monthly license fees shall be made by the licensee on or before the fifth day of each month for the preceding month.

Sec. 6a. Any license granted hereunder shall be subject to revocation or suspension by a court of proper authority and jurisdiction: PROVIDED, HOWEVER, That the state health commissioner, or the city board of health if the trailer coach park is located within the limits of a city having an organized board of health, or by the county health officer if the county has a county health officer, or the state police or sheriff or any peace officer having jurisdiction thereof, shall first serve or cause to be served upon the licensee a written notice in which shall be specified the way or ways in which such licensee has failed to comply with this statute, or any special rules or regulations promulgated by the state health commissioner pertaining hereto. Said notice shall require the licensee to remove or abate such nuisance, unsanitary or objectionable conditions, specified in such notice, within 5 days, or within such longer period of time or extended period of time, as may be allowed by the complaining official or officer. If the licensee fails to comply with

the terms and conditions of said notices, within the time specified or such extended period or periods of time the complaining official, state police, or peace officer making such complaint, may require the prosecuting attorney in the county in which such violation occurred to start a civil action to remove or abate such nuisance, insanitary or objectionable condition as complained of, in the court of proper authority and jurisdiction, of the city or county, in the name of the people of the state of Michigan; and if found guilty, a decision may be entered by the court to revoke or suspend such license.

Sec. 6b. It shall be unlawful for any person, firm, or corporation to establish, maintain, conduct, carry on, or operate a trailer coach park without first having received a permit to establish, construct, or make alteration upon, and a license to maintain, conduct, carry on, and operate a trailer coach park, duly signed and executed, in the name of the people of the state of Michigan, and signed by the state health commissioner, conspicuously displayed under glass, in the office of the trailer coach park.

Sec. 6c. All licenses issued under this act shall be personal to the licensee and be nontransferable without the written consent of the licensor first being obtained.

Sec. 7. No domestic animals or house pets shall be allowed to run at large, or commit any nuisances within the limits of a trailer coach park. Each trailer coach park licensed under the provisions of this act shall, among other things, provide for the following, in the manner hereinafter

specified, to wit:

(a) Supervision. Every trailer coach park shall be in charge of a responsible attendant or caretaker at all times, whose duty it shall be to maintain the park, its facilities and equipment in a clean, orderly, and sanitary condition, and be answerable, with the licensee, for any violation of the provisions of this act.

(b) Location and space.

1. No trailer coach park shall be so located that the drainage of the park area will endanger any water supply. All such parks shall be well drained and shall be located in areas free from ponds, swamps, and similar places in which mosquitoes may breed. No waste water from trailer coaches shall be desposited on the surface of the ground.

2. Each trailer coach shall be allotted a site of not less than 700 square feet. No trailer coach shall be parked closer than 3 feet to the side lot lines of a trailer coach park, if the abutting property is improved property, or closer than 10 feet to a public street or alley. Each individual trailer site shall abut or face on a driveway or clear unoccupied space of not less than 20 feet in width, which space shall have unobstructed access to a public highway or alley. there shall be a space of at least 10 feet between every trailer coach. Such space shall not be used for parking motor vehicles.

(c) Water supply. An adequate supply of water of safe, sanitary quality, approved by the state department of health shall be furnished at each trailer coach park. Water from other sources than that supplied by a city, village is

proposed to be used, the source of such supply shall first be approved by the state health commissioner. At least 1 water supply outlet shall be provided within 100 feet of every individual trailer site.

(d) Toilet, bathing, and laundry facilities:

1. All plumbing in trailer coach parks shall comply with the state plumbing code, the rules and regulations of the Michigan department of health, and with any or all local ordinances pertaining to plumbing and the disposal of sewage other water carried wastes.

2. Toilet facilities shall be provided in a building which is conveniently located, well constructed, having good natural and artificial lighting, adequate ventilation, and floors of concrete or similar impervious materials. Concrete curbing, extending at least 6 inches above the floor, should be provided and the floor sloped to adequate drains.

3. Separate toilet facilities plainly marked by appropriate signs shall be provided for males and females. When a water carriage system of sewage disposal is used, the community building shall be provided with toilet rooms in which shall be installed water closets with proper water supply. Each such water closet shall be placed in a separate compartment, properly separated from any other water closet, each such compartment shall not be less than 3 feet wide and shall be inclosed with proper partition. Such water closet accommodation shall be provided in the ratio of 1 water closet for every 15 females; or less; and 1 such water closet for every

25 males, or less; and in addition at least 1 approved urinal for each male toilet room provided. Such water closet accommodation shall be based on the total park capacity, according to the accepted plans and specifications submitted to the state health commissioner, and shall be computed on the basis of a minimum of 3 persons to each trailer coach. For the purpose of this computation, the sexes shall be considered as being equal in number.

4. There shall be provided in every toilet room, or within 10 feet of the entrance thereof, proper facilities for washing hands, in the ratio of 1 lavatory or sink for every 2 or less water closets for women, and 2 lavatories or sinks for each water closet for men. Separate facilities shall be provided for each sex

5. Every trailer coach park service building shall be provided with conveniently located, approved shower bath compartments, for both sexes. An adequate supply of hot and cold running water shall be available at all reasonable hours. A minimum of 1 approved shower shower head for every 20 persons for each sex or major fraction thereof, based on the estimated population, as hereinbefore provided. In combination with such shower stall, there shall be provided an individual dressing compartment not less than $2\frac{1}{2}$ by 3 feet in plan, so arranged as to insure privacy and be protected by waterproof partition or shower curtain. The floor of such compartment shall be waterproof and elevated 3 inches above the floor of the shower stall. Mats, grids, and walkways made of wood, cloth or other absorbent materials will not be approved for use in bath section

of service building.

6. A laundry room or building constructed as specified in section 7 (d) 2 shall be provided with hot and cold running water and sufficient laundry trays to accommodate the patrons of the trailer coach park: PROVIDED, HOWEVER, that no laundry trays shall be located in toilet or bathrooms.

(e) Disposal of sewage and other water carried wastes.

1. All sewage and other water carried wastes shall be disposed of into a municipal sewerage system whenever available. In trailer coach parks in which such connections are not available, disposal shall be into a private system which includes a sanitary means of disposal, the operation of which creates neither a nuisance or a menace to health.

2. When a water carriage system of sewage is used, each trailer coach lot shall be provided with a sewer connection for the combined liquid waste outlet or outlets of each trailer coach, and trapped below the frost line. It shall be the duty of the owner or operate of said trailer coach park to provide a water and odor tight connection from the trailer water drainage to the sewer connection, and it shall be the duty of said owner or operator to make such connection and keep all occupied trailer coaches connected to said sewer while located in a trailer coach park. Sewer connections in unoccupied trailer lots shall be so closed that they will emit no odors or cause a breeding place for flies. No water or waste shall be allowed to fall on the ground from a trailer coach.

3. A place of such a design and arrangement as to be easily kept clean and located within 200 feet of each individual

trailer site shall be provided where slop pails and empty garbage cans may be cleaned. Water under pressure shall be available at such places and proper protection provided to prevent back-siphonage.

(f) Garbage and rubbish storage and disposal:

1. Flyproof and watertight metal containers shall be supplied for the storage of garbage. At least 1 container shall be provided for every trailers.

2. Garbage cans shall be emptied at least every 2 days and shall not be filled to overflowing, or allowed to become foul smelling, or a breeding place for flies.

3. Garbage and rubbish shall be disposed of in a manner which creates neither a nuisance or a menace to health and which is approved by the state health commissioner.

(g) Central cooking and eating facilities:

When community kitchens and dining rooms are provided, such facilities and equipment as are supplied must be maintained in a sanitary condition and kept in good repair.

(h) Electrical outlets: Electrical outlets for each individual trailer site shall be provided and the installation shall be in compliance with all state and local electrical codes and ordinances. No connected electric extension cord shall lie on the ground or be suspended less than 7 feet from the ground.

(i) Fire protection: Fire extinguishers of a type approved by the state fire marshal for use at trailer coach parks shall be placed at locations within 200 feet of

each individual trailer site. Each fire extinguisher shall be periodically examined and kept at all times in a condition for use.

Sec. 7a. When the state health commissioner has approved an application for a permit to construct or make alterations upon a trailer coach park or the appurtenances thereto a license to operate and maintain the same he shall retain the original and keep a file thereof, 1 copy shall be returned to the applicant or his agent, 1 copy to the city board of health if the trailer coach park is located within the limits of a city having an organized board of health, or to the county health officer if said trailer coach park is located outside the limits of a city in a county having a county health officer.

The state health commissioner shall draft and supply all forms and blanks and specify the number and details necessary to obtain permits to construct or make alterations upon trailer coach parks; and for a license to operate and maintain such a park according to this act.

Sec. 7b. Each city board of health and county health officer shall keep a record of all trailer coach parks within his jurisdiction; said records to show the names and addresses of all trailer coach parks, names and addresses of the licensees, number of trailer coach lots in each park, source of water supply, system of sewage and garbage disposal, and any other information deemed essential by the state health commissioner; said records to be made in duplicate; 1 copy to be kept on file in the office of the city board of health or county health officer compiling said record, and the duplicate to be delivered

to the state health commissioner, who shall keep a record of all trailer coach parks in the state of Michigan. In municipalities or counties where there is no city board of health or county health officer, the state health commissioner shall compile said records in duplicate, keep 1 copy for his records, and deliver 1 copy to the clerk of the municipality in which such park or parks are located; said clerks to keep a permanent file of all records received by them of trailer coach parks within their jurisdiction.

Sec. 7c. Each city shall notify, or cause to be notified, the treasurer of each municipality of the issuance of each trailer coach park license issued within the jurisdiction of such treasurer.

It shall be the duty of the state health commissioner to supply licenses of all trailer coach parks with any and all health rules and regulations, pertaining thereto made by the Michigan department of health, and any change or changes that may be made from time to time which shall be posted and kept posted by the management in a protected, conspicuous place within the trailer coach park.

Sec. 7d. It shall be the duty of each licensee to file a report each month with the school board or boards of the school district or respective districts, wherein the trailer coach park is located, giving the names and ages of all children of school age in attendance thereof, living in said trailer coach park before the fifth day of each month.

If the owner or occupant of property adjacent to a trailer coach park should demand that a fence be built around his

property lines, the operator of said trailer coach park shall build a suitable fence of not less than 4 feet in height or more than 6 feet in height, constructed of woven wire or open metal or a wooden fence. Barbed wire shall not be used in the construction of any fence.

No animal washing, car washing, or other slop treating practice shall be carried on in any trailer coach park, in any building structure, or any other place within the trailer coach park, not designated and approved for such purpose.

All streets and driveways in every trailer coach park must be maintained in a passable and reasonably dustproof condition at all times, and shall have minimum width of not less than 20 feet.

• Every trailer coach park and every portion thereof must be lighted at night.

Every trailer coach park shall be so arranged that the walking distance from any trailer coach unit parking site to water, toilet, and shower accommodations will not exceed 300 feet.

It shall be the duty of every owner or operator, or attendant of any trailer coach park in the state of Michigan to report to the city board of health, county health officer, or state health commissioner, the full name, age and address of every person who is affected or suspected of being affected with any reportable or communicable disease.

The management of every trailer coach park shall assume full responsibility for maintaining in good repair and condition all sanitary and safety appliances on said park, and

shall promptly bring such action as is necessary to prosecute or eject from said park any person or persons who wilfully or maliciously damage such appliances, or any person or persons who fail to comply with the regulations of this act.

Sec. 7 e. It shall be the duty of the city board or the county health officer, if there be such in the municipality or county, or otherwise the state health commissioner, their inspectors or representatives, to inspect each trailer coach park at least once each year and oftener if necessary.

Sec. 8. Each trailer coach park shall be provided with a custodian's office where each trailer coach entering such trailer coach park shall be assigned to a lot location, given a copy of the trailer coach park rules, and registered according to the prescribed form. Said registrations shall include the name and address of every occupant of said trailer coach; the license number of all units; the state issuing such licenses and a statement indicating the exact location at which such trailer coach was last parked, including the state, city, town, or village where such parking occurred, and the place to which said occupants declare a removal therefrom. The licensee shall keep a registry of all children of school age occupying coaches in the trailer coach park. The above mentioned register shall be signed by an occupant of said trailer coach, cognizant of all facts contained in said registration. Any person furnishing misinformation for purposes of registration shall be deemed guilty of a misdemeanor and punishable under the general statutes of the state of Michigan for such offense, the

registration records shall be neatly and securely maintained, and no registration records shall be destroyed until 6 years have elapsed following the date of registration. The register shall be available at all times for inspection by law enforcement officers.

Sec. 9. The school district board in the school district in which such trailer coach park is located, by and through its officers, attendance officers and proper employes, is hereby empowered and given authority to inspect and visit said trailer coach park for the purpose of examining said register with reference to children of school age, and examining said trailer coach park with reference to housing conditions of children of school age, and with reference to enforcing attendance of school children housed in said trailer coach park in the schools of said district: PROVIDED, That where a trailer coach park is located in 2 or more school districts, the school district boards of said districts, acting jointly, shall be and are hereby authorized to proceed under the provisions of this section. Whenever the school district boards of more than 1 district meet jointly, they shall elect 1 of their number chairman and another clerk thereof.

Sec. 10. As a condition precedent to the approval and granting of a license for a trailer coach park, each applicant for license of said trailer coach park shall make, execute, and deliver to the state health commissioner a bond or bonds to be executed by any surety company or companies authorized to

do business in the state of Michigan, in an amount of \$1,000.00, for the faithful performance of the provisions of this act and the payment of all license fees provided for herein.

Sec. 12. Nothing in this act should be construed to include the state parks of Michigan.

The term "trailer coach park" shall not be construed to include buildings, tents, or other structures maintained by any individual or company on their own premises and used exclusively to house own farm labor.

Any trailer coach park owned or operated by any municipal subdivision of the state of Michigan shall meet all sanitary and safety provisions of this act, shall be inspected as herein provided, shall pay or cause to be paid to the county treasurer, municipal treasurer and school board or school boards the respective amounts, as herein provided for the licensee to pay as monthly license fees, and keep a register and make all reports, as herein required of a licensee.

Sec. 13. It shall be the duty of the county health officer, in counties maintaining a county health officer, and the duty of the city board of health, in cities maintaining an organized board of health, the state health commissioner, sheriff, state police or any other peace officer, to enforce the provisions of this act and the rules and regulations of the Michigan department of health affecting health, sanitation, water supply, sewage, garbage and waste disposal, and the said health officer, or his inspectors, shall personally inspect,

at least once each year, each trailer coach park and all the accommodations and facilities connected therewith. Such officials or officers are hereby granted the power and authority to enter upon the premises of such trailer coach parks at any time for the purposes herein set forth, or for the purpose of enforcing any other Michigan statute or municipal ordinance.

Sec. 14. If any applicant for a trailer coach park license desires to operate such trailer coach park only during the months of from May 1 to October 1, he shall pay only one-half the above mentioned annual license fee, but he shall pay the monthly license fees during such months of operation as herein provided. If in the opinion of the state health commissioner, the sanitary requirements herein contained are too rigid for the trailer coach parks operating only between May 1 and October 1, he may modify such requirement as circumstances may permit and require.

Sec. 15. Whenever a power is granted, or a duty is imposed upon a public officer, or city board of health, the power may be exercised or the duty may be performed by a deputy of the officer or city board of health, or by a person authorized, pursuant to law, by the officer or city board of health, unless this act expressly provides otherwise.

Sec. 16. Should any sentence, word, phrase, clause, or provision of this act be held to be invalid for any reason, such holding shall not be construed as affecting the validity of any remaining portion of this act, it being the legislative

intent that this act shall stand notwithstanding the invalidity of any such sentence, word, phrase, or clause provision.

Sec. 17. All acts or parts of acts, in any way inconsistent with, or repugnant to, the provisions of this act are hereby repealed

Sec. 18. This act shall be construed as an emergency act, for the public peace, health, and safety. There is a great shortage of habitable house for defense workers and the trailer coach has become a necessity, and there is a great shortage and need of sanitary regulated trailer coach park.

This act is ordered to take immediate effect.

TOILET, BATHING AND LAUNDRY FACILITIES

The facilities are based on 100 house trailers and on the State requirement under Public Act No. 255.

All computations are on the basis of a minimum of 3 persons to each trailer coach the sexes shall be considered equal in number.

The total number of women 150

The total number of men 150

Women Requirements

1 water closet for 15 women 10

1 lavatory for every 2 water closets for women 5

1 shower head for every 20 women 8

Men Requirements

1 water closet for every 25 men 6

2 lavatories for every water closet for men 12

1 shower head for every 20 men 8

1 approved urinal 1

THE TRAILER LOCATION AND SPACE REQUIREMENTS

1. Trailer allotted site of not less than 700 sq. ft.
2. No trailer parked closer than 3 feet to side of lot lines of trailer park.
3. Each individual trailer site shall abut or face on a drive way of not less than 20 ft. in width which shall have unobstructed access to a public highway or alley.
4. There shall be at least 10 ft. between every trailer.

DESCRIPTION OF PROPERTY

The trailer Coach Park is located on two parcels of land which are lots Number 17 and 15 of Supervisors Flat No. 1, Lansing Township, Sec. 13, T 4 N, R 2 W.

Lot No. 17

Beginning at the N.W. corner of lot No. 17 S $1^{\circ}7'$ W 100', thence S $89^{\circ}27'11''$ W 44.0', thence S $1^{\circ}7'$ W 340.0', thence N $89^{\circ}5'$ E 259.5', thence N $54'$ W 439.4', thence S $89^{\circ}27'$ W 217.2' to point of beginning.

Lot No. 15

Beginning at the N.W. corner of Lot No. 15 S $54'$ E 297.2', thence N $89^{\circ}15'$ E 301.0', thence N $54'$ W 149.0', thence S $89^{\circ}27'$ W 84.5', thence N $54'$ W 147.5', thence S $89^{\circ}27'$ W 216.5' to the point of beginning.

AREA OF LOT No 17

STA.	BEARING	DIST.	LATITUDE		DEPARTURE		BALANCED		DMD	DOUBLE AREA	
			N+	S-	E+	W-	LAT.	DEP.		+	-
A	S1°7'E	440.0'		439.92	8.58		440.58	+ 8.58	8.58		3775.9
B	N89°15'E	259.5'	3.40		259.48		+ 3.40	+259.50	276.66	940.6	
C	N0°54'W	439.4'	439.35			6.90	+439.19	- 6.90	529.26	232445.7	
D	S89°27'W	261.2		2.51		261.19	-2.51	-261.18	261.18		655.6

442.75 442.43 268.06 268.09

DIFF IN LAT = 32'
 DIFF IN DEP = .03'
 DOUBLE AREA = 5.256 ACRES
 AREA = 2.628 ACRES

AREA LOT N^o 15

STA	BEARING	DIST.	LATITUDE		DEPARTURE		BALANCED		D.M.D.	DOUBLE AREA	
			N +	S -	E +	W -	LAT.	DEP.		+	-
E	S 54'E	297.2		297.16	4.67		- 297.33	+ 4.67	4.67		1388.5
F	N 89°15'E	301.0	3.94		300.97		+ 3.94	+ 300.96	310.30	1222.6	
G	N 54'W	149.0	148.98			2.34	+ 148.89	- 2.34	608.92	90662.1	
H	S 89°27'W	84.5		.81		84.49	- .81	- 84.49	522.09		422.9
I	N 0°54'W	147.5	147.48			2.32	+ 147.39	- 2.32	435.28	64155.9	
J	S 89°27'W	216.5		2.08		216.48	- 2.08	- 216.48	216.48		450.3
			300.40	300.05	305.64	305.63					

DIFF. IN LAT. = 35'
 DIFF. IN DEP. = .01'
 DOUBLE AREA = 3.53
 AREA = 1.765 ACRES

DESIGN OF BUILDING

Heating Requirements

The Amount of Radiation Required for Each Room

The Men's Room

$$R = \frac{20C + 120W + 300G}{1000}$$

$$C = \text{Contents Cu. ft.} = 5984$$

$$W = \text{Exposed wall surface Sq. ft.} = 552$$

$$G = \text{Glass and Door Area Sq. ft.} = 93$$

$$R = \text{Radiation in Sq. ft.}$$

$$R = \frac{20 \times 5984 + 120 \times 552 + 300 \times 93}{1000} = 213.82$$

Add 20% for vapor system

Add 10% for prevailing winds

$$\text{The New R} = 1.30 \times 213.82 = 277.97 \text{ sq. ft.}$$

The Women's Room

$$\text{Same as the Men's Room} \quad 278 \text{ sq. ft.}$$

The Office

$$C = \text{Contents cu. ft.} = 720$$

$$W = \text{Exposed wall surface} \quad 144$$

$$G = \text{Glass and Door area} \quad 36$$

$$R = \frac{10C + 120W + 300G}{1000}$$

$$R = \frac{10 \times 720 + 120 \times 144 + 300 \times 36}{1000} = 35.28 \text{ sq. ft.}$$

The Store Room

$$C = 360 \quad R = \frac{10 \times 360 + 120 \times 112 + 300 \times 39}{1000}$$

$$W = 112$$

$$G = 39 \quad R = 15.6 \text{ sq. ft.}$$

The total for the first floor = 607 sq. ft.

The Laundry Room

The Laundry Room

$$C = \text{Contents cu. ft.} = 34 \times 21 \times 9 = 6426 \text{ cu. ft.}$$

$$W = \text{Exposed wall surface} =$$

$$2.5 \times (34 + 21) = 137.5$$

$$8 \times 13.5 = \underline{108.0}$$

$$245.5 \text{ sq. ft.}$$

$$G = \text{Exposed glass area} = 5 \times 4.14 = 20.7$$

$$R = \frac{100 + 120W + 300G}{1000}$$

$$R = \frac{100 \times 6426 + 120 \times 245 + 300 \times 20.7}{1000}$$

$$R = \frac{64260 + 29520 + 6300}{1000}$$

$$R = 100.08 \text{ sq. ft. Radiation}$$

The Recreation Room

$$\text{Same as the Laundry Room } 100 \text{ sq. ft. Radiation}$$

The Furnace Room

$$\text{No Radiation from Furnace Room required}$$

Total Amount of Radiation Required

$$\text{Main Floor } 607 \text{ sq. ft.}$$

$$\text{Laundry Room } 100 \text{ sq. ft.}$$

$$\text{Recreation Room } \underline{100 \text{ sq. ft.}}$$

$$807 \text{ sq. ft.}$$

For Safety Factor and starting load we will use

$$800 \times 1.5 = 1200 \text{ sq. ft. Radiation}$$

Nearest Steam Boiler size

$$1170 \text{ sq. ft. Radiation}$$

The Design of Floor Joists

The partition 13' long x 8' high = 104 sq. ft.

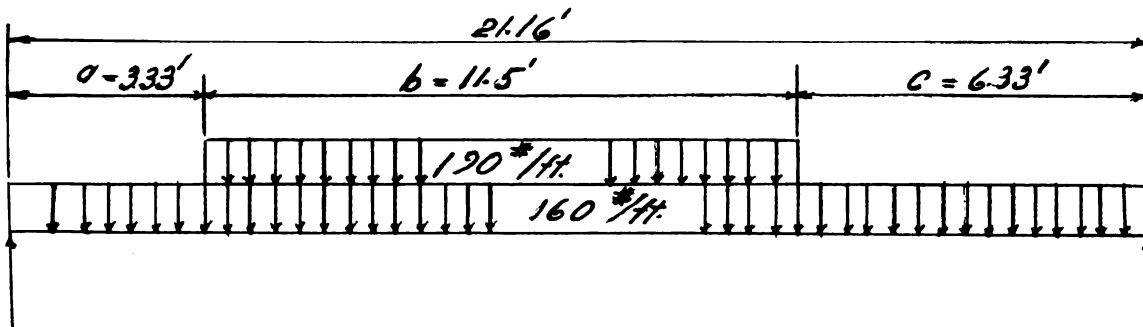
Metal lath and plaster, both sides, 2x4 studs, 180#/ft.

For human occupancy use live load 40#/sq. ft.

For floor load use spacing of joists 2' centers

Uniform Load

$$80\#/ft. \times 2 = 160 \#/ft.$$



Uniform load partially distributed

$$R_1 = \frac{wb}{2} (2c + b) = \frac{190 \times 11.5}{2 \times 21.16} (2 \times 6.33 + 11.5)$$

$$= \frac{2172}{42.32} \times 24.16 = 1240 \#$$

$$X = a + \frac{R_1}{w} = 3.333 + \frac{1240}{190} = 9.85 \quad \text{use } 9.9$$

$$\begin{aligned} M_x &= R_1 x - \frac{w}{2} (x-a)^2 \\ &= 1240 \times 9.9 - \frac{190}{2} (9.85 - 3.333)^2 \\ &= 8242' \# \end{aligned}$$

Uniformly distributed load

$$\begin{aligned} M_x &= \frac{wx}{2} (1-x) = 160 \times 9.9 (21.16 - 9.9) \\ &= \frac{1584}{2} (11.26) = 8917.92' \# \end{aligned}$$

$$\text{Total moment} = 17160' \#$$

$$\text{Section Modulus} = \frac{17160 \times 12}{18000}$$

The section modulus for 4 x 12 joists 10#/ft. 10^3

There for the joists would not be large enough for
24# centerings

Try 18" centering of joists

The partition load will be the same and produces the
same moment

$$M = 8242' \#$$

Floor load

Dead load wt. 4# concrete and fly-rib 36#/sq. ft.

Live load 40#/sq. ft.

1 ft. on joists covers 1.58 sq. ft. 76 #/sq. ft.

$$\begin{array}{rcl} 1.58 \times 76 & 120\#/ft & \\ \text{Wt of joists} & \frac{10}{130\#/ft} & \end{array}$$

$$\begin{aligned} M_x &= \frac{WX}{2} (1-x) = \frac{130 \times 9.9}{2} (21.16 - 9.9) \\ &= 65 \times 9.9 (11.26) \\ &= 7246 \end{aligned}$$

The total Moment = 15488

$$\text{Section Modulus} = \frac{15488 \times 12}{18000} = 10.33$$

Joists 16" Center S

The partition load will be same and produces the same moment

$$M = 8242'\#$$

One foot along joists covers 1.33 sq. ft.

$$\text{Uniform load} = 72\#/sq. ft. \times 1.33 = 96\#/ft.$$

$$\begin{aligned} \text{Wt of joists} &= 10\#/ft. & = \frac{10\#/ft.}{106\#/ft.} \end{aligned}$$

$$M_x = \frac{106 \times 9.9}{2} (11.26) = 5908'\#$$

$$\begin{aligned} \text{Max Moment} &= (8242 + 5908) 12 \\ &= 14150 \times 12 = 169800'\# \end{aligned}$$

$$\text{Section Modulus} = \frac{169800}{18000} = 9.4''^3$$

For the ceilings of all rooms use

2" x 4" 16" centers Longest span 12'

Use 1-A Hy Rib lath 32\#/sq. yd.

Wt. of plaster 5/8" grounds 52\#/sq. yd.

The total load = 55.2\#/sq. yd. | wt. of 2"x4"s

Plaster and lath load = 6.2#/ft.

The wt of 2"x4" southern yellow pine = 1.7#/ft.

The total wt per ft. = 10 #

$$M = \frac{10 \times 12^3 \times 12^6}{8} = 180 \text{ ft. lbs.}$$

$$S = \frac{198 \times 12^3}{1200} = 1.98 \text{ " }^3$$

$$\text{Section Modulus for } 2 \times 4 = 3.56 \text{ " }^3$$

In the first design of the floor joists the ceiling load was not carried by the partition, therefore the joists will have to be rechecked.

Recheck of Floor Joists

The ceiling load was not figured in the calculation of the size of the floor joists. The ceiling load will be carried by the partition. This load will be figured as a concentrated load at the center.

The load of ceiling 10#/sq. ft., 16" centers 22 ft. span. Half the ceiling load will be carried by the side walls.

$$\text{Concentrated load} = 11 \times 1.33 \times 10 = 147 \#$$

There will be an increase in moment of

$$M = \frac{1}{2}Pl = \frac{1}{2} \times 162 \times 10 = 735 \text{ ft lbs.}$$

The new moment = 14885 ft. lbs.

The Section Modulus = 9.93

Use 4"x12" joists 10#/ft. -----S = 10

Design For Roof I Beam

Roof load for rise of 4" or less use vertical live load of 30 #/sq.ft. vertical projection.

Dead load - weight of sheathing	2½ #/sq.ft.
Roofing 3 ply felt and gravel	5½ #/sq.ft.
Live load	30 #/sq.ft.
	<hr/> 38 #/sq.ft.

Assume 16" centering

Try 2" x 10" x 17' Southern Yellow Pine Rafters which weigh 4.3 #/ft. Assume a weight of 22 #/ft. for I beam. The total wt. of rafter on beam equals 934.22 #, one rafter covers 16" along beam therefore use 723 #/ft. in calculating the moment for the I beam.

$$M = 1/8 \times 723 \times 21 \times 21 = 39,855 \text{ ft.lbs.}$$

Use $f = 20,000 \text{ #/sq.in.}$

$$S = \frac{39,855 \times 12}{20,000} = 23.91 \text{ in}^3$$

Use 12" x 4" Light I Beam 22 #/ft. $S = 25.3 \text{ in}^3$

Calculation Size for Rafters

Assume 16" centering for rafters

Try using 2" x 10" 4.3 #/ft.

One foot along rafter 1.33 sq. ft.

$$38 \times 1.33 = 51 \text{ #/ft.}$$

$$\text{wt. of rafter} = \frac{5 \text{ #/ft.}}{56 \text{ #/ft.}}$$

$$\text{Max. Moment} = 2,023 \text{ ft. lbs.} \quad \text{Section Modulus} = 20.23 \text{ in}^3$$

Use 2" x 10" Southern Yellow Pine - Bending Stress 1200 #/sq.in

$$\text{Section Modulus} = 24.4 \text{ in}^3$$

The size of joists for office

The live load = 40 #/sq ft.

The Span = 10 ft.

Assume wt. of floor as 40 #/sq.ft.

From tables a 3" x 4" joists 3.7 #/ft. with 16" centerings
and with 10 ft. span will carry 84 #/sq.ft.

Therefore we will use a 3" x 4" joist.

The size of rafters over office.

The roof will slope towards the building and have a span of
10 ft. and with 16" centers.

The total load on roof is 38 #/sq. ft.

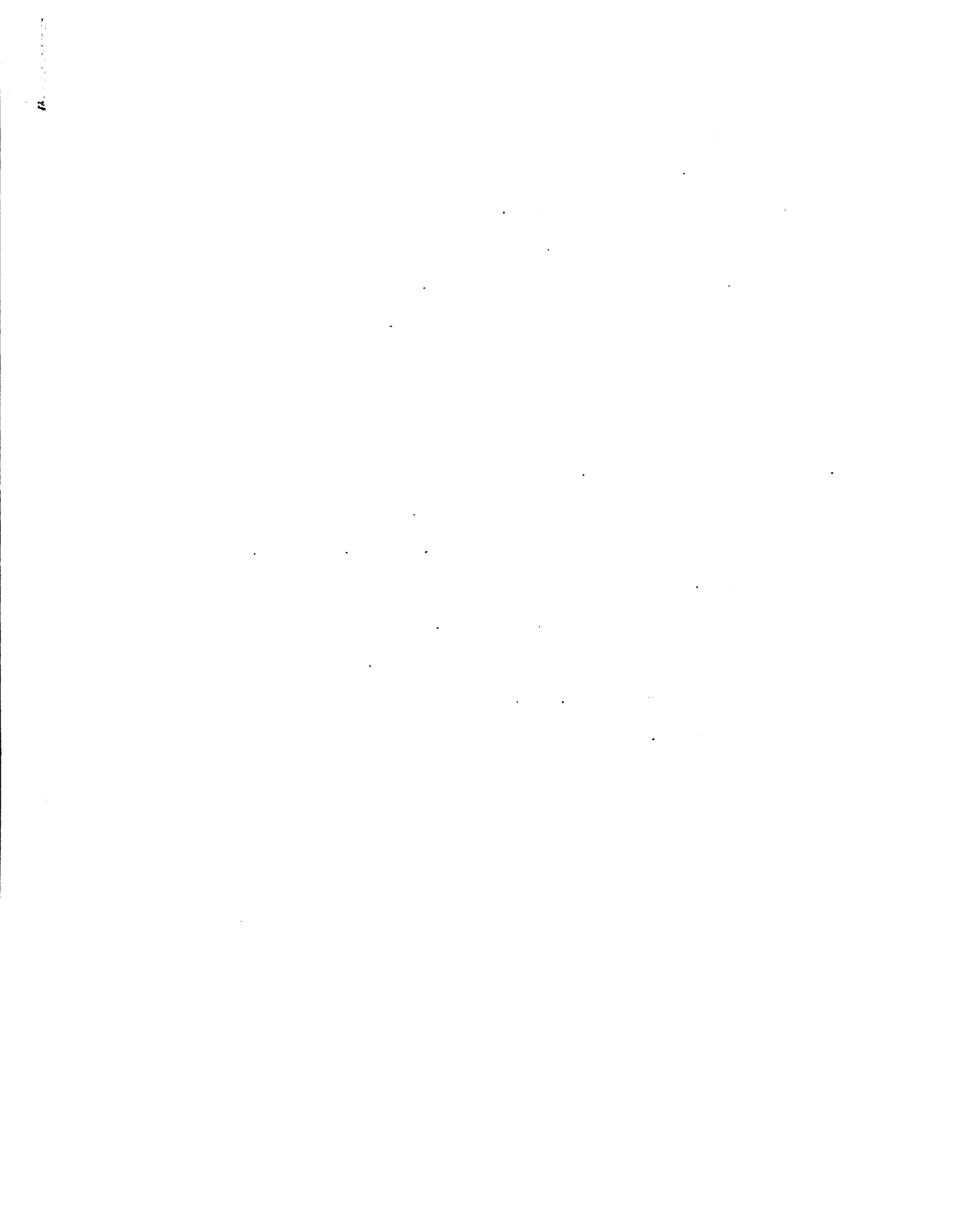
Try using 2" x 6" Southern yellow pine, 2.6 #/ft., $S = 8.57 \text{ in}^3$
 $f = 1200 \text{ #/sq.in.}$

One foot along rafter covers 1.33 sq.ft.

Use 51 #/ft. in finding the Max Moment.

Max Bending moment = 675 ft.lbs.

Section modulus = 6.75 in^3



Calculation Size of Footings

The total height of building is 23', or 34 blocks high.

The blocks weigh 50 # each or a total of 1700 # along 16" of footing. The load on footing would be 1280 #/ft.

The floor load = 1765 #/ft.

Ceiling load = 112 #/ft.

Wt. of footing = 150 #/ft.

^T
The Total Load = 3307 #/ft.

Assume a soil pressure of 3000 #/ft.

Area of footing = 1.102 sq. ft.

Try footing 14" wide = 1.17 sq. ft.

$$M. = \frac{P X^2}{2 \times 12} = \frac{3307 X^2}{24} = 138 X^2$$

Section "b" inches wide and "t" inches thick, allowable tension = 40 #/sq.in.

$$\text{Section Modulus} = \frac{b t^2}{6} = \frac{M}{f}$$

$$t^2 = \frac{6 M}{b f} = \frac{6 \times 138 X^2}{12 \times 40} = 1.72 X^2$$

$$t = 1.31 X$$

At section of max moment $X = 3"$, $t = 4"$

For safety factor double the depth of footing.

Use footing 14" wide and 8" deep.

COSTS OF BUILDING

The Costs of Excavating Sandy Soil

Removal by team and scraper with helper at \$2.50 per hour, moving 4 cu. yd. per hour.

$$\text{The Costs} = \frac{428}{4} \times 2.50 = \$267.50$$

The Costs of Footings

All Concrete is hauled to the job at \$6.00 per yard.

In the Construction of the forms we use 2½ Ed. Ft. lumber for every sq. ft. of forms. The labor for setting and removing of forms is \$.08 per sq. ft. of forms.

Labor setting forms

$$256 \text{ lineal ft. footings} = 171 \text{ sq. ft.}$$

$$171 \times .08 = \$13.68$$

$$\text{Cost of Lumber} = \$30.00 \text{ per 1000}$$

$$\text{Use Lumber twice } \$15.00 \text{ per 1000}$$

$$\text{Say use } 1/3 \text{ waste} = 560 \text{ Ed. ft.} = \underline{\underline{8.40}}$$

$$\text{Material and Labor setting forms} = \$22.08$$

The Cost of Footings

256 lineal ft. footings which is equal to 7.4 yds concrete at \$6.00 per yd. \$44.40

Labor placing Concrete @ \$.50 per yd. 3.70

Use 3-3/8" Reinforcing bars @ 1.14 lbs per ft. Total weight reinforcing bars =

$$292\# @ \$2.50 = \text{7.30}$$

Labor costs in placement of reinforcing

$$\text{bars @ } \$15.00 \text{ per ton} = \underline{\underline{2.25}}$$

$$\text{Total} \quad \$57.65$$

THE QUANTITY CEMENT BLOCKS REQUIRED

Use concrete blocks below grade and cinder blocks above.

Basement wall 12 blocks high equals 8 ft.

The Area C Basement Wall

Main basement	1504 sq. ft.
Furnace room	288
Outside stairways	<u>256</u>
Total	2048 sq. ft.
The total no of cement blocks	1830
The cost of labor and material, \$.25 per block	
Laying of blocks for building	\$458.00

CINDER BLOCKS REQUIRED FOR BUILDING

Men's and women's room	2620
Office and store room	540
Outside stairways	<u>128</u>
Total	3488
Less windows	<u>140</u>
Total Area	3348
No cinder blocks	2988
The cost of labor and material in above grade	747.00
Total costs of walls including labor and material . .	\$1205.00

WATER AND DAMP PROOFING BASEMENT

Cost of applying plaster coat	\$.10 sq. ft.	\$130.00
Cost of asphalt and labor	.03	39.00
Total costs of water proofing		<u>\$169.00</u>

COSTS OF MAIN FLOOR

64 steel joists 4" x 12" x 21'		
10 steel joists 3" x 4" x 10'		
Costs of joists delivered on job	\$5.00 per 100 lbs.	690.50
Costs labor placing floor joist at	\$2.50 for 100sq. ft	40.00
Costs of metal lath @ .07 sq. ft.		112.00
Costs of placement metal lath	\$.01 per Sq. Ft.	16.00
Costs of 3" coat concrete	15 yds	90.00
Costs of placement and finishing at	\$1.00 per hour	
and covers 100 sq, ft, per, hr.		15.00
Costs of finish coat	6 yds @ .15 sq. ft.	<u>210.00</u>
		\$484.00

COSTS OF STEEL SASH

The office: 2 Casement windows complete with glass		
and hardware	\$12.50 each	\$ 25.00
Men's and women's room		
10 steel sash 12" x 18" glass	4 lt. wide 2 light-	
high 4' 2 3/8 x 3' 1 5/8" each		65.60
80 lights of hammered glass	.24 per light	19.20
Required 1# to 5' lineal sash 1# per light use 100#		4.75
Labor to glaze sash	.14 per light	<u>11.20</u>
		\$125.75

COSTS OF FRAMING WOOD STUDS AND CEILING JOISTS

Labor framing wood studs

Carpenter frame 50 bd ft labor per hr. with

help common labor of 1/4 carpenters time

Costs of frame 100 bd ft \$ 3.00

The no. of bd ft in interior partitions 2200

Costs of framing interior partitions 66.00

The material for interior partitions @ \$40 88.00

The no. of bd. ft. for ceilings 50 bd ft per 100 sq ft

is equal to 1210 bd ft in ceilings @ \$40 51.20

The labor costs 31.40

Cost of material framing partitions \$245.60

COSTS OF METAL LATHING

178 sq. yds of ceilings

426 sq. yds. of walls to be lathed

Metal lath for ceilings \$.25 sq. yd. \$ 44.50

Metal lath for walls \$.23 sq. yd. 98.44

Labor costs applying metal lath to wood

\$.12 per sq yd. 72.72

Total \$215.66

COSTS OF INTERIOR PLASTERING

There is 5170 sq. ft. of walls

There is 1500 sq. ft. of ceilings

There is 100 sq. ft. of door opening

There is 140 sq. ft. of window openings

Carried Forward \$264.13

Carried forward	\$264.13
Requires 1200 lbs. pitch @ \$1.50 per 100 lbs. . . .	18.00
In labor applying felt and gravel @ \$1.25 per sq. . .	20.00
Roofing Gravel 400# per sq.	9.60
Required 2 I Beams 4" x 12" x 22' 22# ft.	
Total of 968#	48.40
Labor placing I beam	<u>6.00</u>
TOTAL	\$366.13

COSTS CONCRETE BLINDS FOR WINDOWS

Costs of material and labor for forms	\$25.00
Costs of concrete 3 yds. @ \$7.00 yd.	21.00
Costs of steel reinforcement 3/8" 50 lbs.	1.25
Costs of inside window sills	<u>18.00</u>
TOTAL	\$65.25

COSTS OF CONCRETE CAP ON WALL

Costs of concrete 2.5 yds. @ \$7.00	\$17.50
Costs of placement and finishing	10.00
Costs of lumber for forms and material used twice	
at \$40 per 1000.	7.35
Costs labor placing forms \$1.06 sq. ft.	<u>10.00</u>
TOTAL	\$44.85

THE COSTS OF DOORS AND TRIM

7	2-6 x 6-8	1 3/4" @ \$6.30 each	\$44.10
1	3-0 x 6-8	1 3/4" @ 6.71 each	6.71
16	2-0 x 6-0	1 3/8" 6 Panel Fir @ \$2.40	38.40
1	2-6 x 6-8	1 3/8" 6 Panel Fir @ 2.90	2.90

HARDWARE FOR DOORS

6	Keyless type lock sets	@ \$2.00 each	12.00
2	Cylinder lock sets	@ 3.00 each	6.00
1	Inside lock set	@ 1.00 each	1.00
16	Bath locks	@ 1.50 each	24.00
6	Door closers	@ 12.60 each	75.60
	Use all metal door trim	\$5.65 each	141.25
8	pair 4" x 4" Butt Hinges	50 pair	4.00
17	pair 3 1/2 x 3 1/2 Butt Hinges	40 pair	6.80
	Labor for fitting door and door jambs	1 hr. setting	

jambs and 1 1/2 hour setting doors @ \$1.00 per hr. . 62.50

Total cost of doors and door jambs \$425.26

COST OF INTERIOR CARPENTER WORK

Requires	14	4' x 5'3/4" Plywood	\$ 37.66
Requires	6	4' x 4'3/4" Plywood	15.84
Requires	416'	x 2" x 3" Soft white pine finish . .	50.00
Requires	12	lock sets of \$.75 each	9.00
Requires	12	hinges of .50 pair	6.00
Costs of carpenter work	35%	Millwork	<u>36.40</u>

Total \$154.90

COSTS OF INTERIOR PAINTING

There is 5170 sq. ft. walls

There is 1500 sq. ft. ceilings

Deduct 120 sq. ft. for window and door openings

Cost of painting figured on 6430 sq. ft.

Cost of two coat work, light colored lead and oil

paint is \$.03 sq. ft. \$192.90

Costs of painting door jambs and casings

Figure 80 sq. ft. of doors for painting at

\$.03 per. sq. ft. 60.00

Figure windows as 25 sq. ft, @ \$.03 sq. ft. 9.00

For basement windows figure 10 sq. ft. per window

@ \$.03 sq. ft. 3.00

Costs of painting radiators \$.02 sq. ft. 24.00

Costs of painting water closet stalls, two coat work

at \$.03 sq. ft. 18.00

Total \$306.90

MATERIAL REQUIRED FOR BASEMENT DRAINS

5	4" Basement floor drains	@ \$1.60	. . . . .	8.00
16	4" Extra heavy single hub	@ 2.80	. . . . .	44.80
4	4" Eighth bends extra heavy	@ .80	. . . . .	3.20
4	4" "Y" branch extra heavy	@ 1.53	. . . . .	6.12
4	4" Clean out ferrule	@ .74	. . . . .	2.96
3	4" Sanitary tees	@ 1.53	. . . . .	4.59
3	4" x 2" Reducers	@ .42	. . . . .	1.26
11	2" Extra heavy soil pipe	@ 1.49	. . . . .	16.39
6	2" Extra heavy "Y" branches	@ .75	. . . . .	4.50
	Carried forward			<u>\$91.82</u>

Carried forward		\$ 91.82
4 2" Extra heavy quarter bends	\$.40	1.60
4 2" Clean out ferrules	.44	1.76
200 lbs. of lead @ \$.15 per lb.	. . . . .	30.00
4 1 1/2" traps @ \$1.40 . . . . .	. . . . .	5.60
10' 1 1/2" gal pipe @ \$.14 per ft. . . . .	. . . . .	1.40
The labor costs of basement plumbing . . . . .	. . . . .	16.00
The labor costs of digging trenches		
80' x 8" x 18" @2.96 yds.		
54' x 12" x 8" <u>1.33</u>		
	\$4.29 yds.	
One man @ \$.75 per hour can excavate 1 cubic yd hour		<u>3.23</u>
Total cost of Basement Drainage		\$151.41

The Costs of Basement Floor

The average depth of 4" for level and grading of Basement at the rate of 54 sq. ft. per hour at \$.75 per hour	\$22.50
The amount of Concrete required is equal to 20 yds. at \$6.00 per yd.	120.00
The labor costs for finishing and placement on an average of 80 sq. ft. an hour, including a finisher and helper at \$2.00 per hour	<u>40.00</u>
Total	\$182.50

Costs of Outside Stairways

Lumber used for forms used twice costs of placing forms at \$3.00 per 100 bd. ft., requires 200 bd. ft. to stairs	\$6.00
The Lumber @ \$20.00 per 1000	4.00
Requires 3 hrs for cement finisher @ \$1.25	3.75
Requires 2 yds. of concrete @ \$6.00	<u>12.00</u>
Total	\$27.25

Cost of Area-ways for Basement Windows

Requires 2 yds. of Concrete @ \$6.00	\$12.00
Placement of Forms takes $2\frac{1}{2}$ bd. ft. to one sq. ft. = 400 bd. ft.	
400 bd. ft. used twice @ \$20.00 =	8.00
Labor placing forms @ \$1.00	15.00
Labor placing concrete @ \$.75	1.50
Labor for Cement Finisher @ \$1.25	<u>3.75</u>
Total	\$40.25

Extra Heavy Cast Iron Soil Pipe Necessary For Main Floor

	At. Ford.	\$151.41
18 - 4" Sanitary Tees 1½" Side Opening (left hand) @ \$2.80		50.40
14 - 4" Quarter Bends @ \$1.02		15.28
15 - 4" Cleanout Ferrule @ \$.74		11.10
4 - 4" Sanitary Tees 2" side opening (left hand) @ \$2.80		11.20
12 - 4" Sanitary 2" taped "T" Branch @ \$1.57		18.84
5 - 4" Sanitary Tees @ \$1.53		7.65
20 - 4" Soil Pipe lengths, Single Hub @ \$2.80		56.00
5 - 4" Soil Pipe lengths, Double Hub @ \$3.00		15.00
256 lbs. of lead @ \$.11 per lb.		<u>28.16</u>
Total		\$213.63

Black Pipe and Fittings for Main Floor Drains

16 - 2" Half "S" traps @ \$2.10	\$33.60
20 - 2" Threaded 90° "Y" @ \$1.00	20.00
8 - 1½" x 1½" x 2" "T" @ \$.80	6.40
70 - 1½" "T" @ \$.55	38.50
200' - 1½" Black Pipe @ \$.15	30.00
150' - 2" Black Pipe @ \$.20	30.00
16 - 2" "T" @ \$.82	<u>13.12</u>
Total	\$171.62

Material Required for Hot and Cold Water Lines

180' - 2" Gal. Pipe @ \$.25 per ft.	\$45.00
100' - 1½" Gal. Pipe @ \$.19 per ft.	19.00
75' - 1" Gal. Pipe @ \$.12 per ft.	9.00
300' - ¾" Gal. Pipe @ \$.09 per ft.	27.00
250' - ½" Gal. Pipe @ \$.07 per ft.	17.50
4 - 2" Gal. Elbows @ \$.40	1.60
10 - 2" Gal. Tees @ \$.75	7.50
5 - 2" Gal. Unions @ \$1.09	5.45
6 - 2" x 2" x ¾" Tees @ \$.60	3.60
1 - 2" Gate Valve @ \$5.00	5.00
12 - 2" Gal. Nipples @ \$.16	1.92
4 - 1½" Gate Valves @ \$4.50	18.00
16 - 1½" x 1½" x 1" Tees @ \$.45	7.20
16 - 1½" x 1½" x ¾" Tees @ \$.45	7.20
12 - 1½" Gal. Tees @ \$.45	5.40
10 - 1½" Gal. Elbows @ \$.35	3.50
10 - 1½" Gal. Unions @ \$.80	8.00
6 - 1½" Plugs @ \$.15	.90
12 - 1½" x 4" Gal. Nipples @ \$.15	1.80
20 - 1" Gal. Tees @ \$.26	5.20
15' - 1" Gal. Elbows @ \$.24	3.60
15 - 1" Gal. Unions @ \$.44	6.60
20 - 1" x 6" Gal. Nipples @ \$.11	2.20
15 - 1" Close Nipples @ \$.07	1.75
10 - 1" Short Nipples @ \$.08	.80
10 - 1" Plugs @ \$.08	.80
10 - 1" Street Elbows @ \$.11	1.10

Soil Pipe Required for Roof Drainage and Vents

24 - Lengths of 4" Soil Pipe--Extra Heavy Single Hub @ \$2.80	\$67.20
8 - 4" Quarter Ends @ \$1.02	8.16
4 - 4" Sanitary "T" @ \$1.53	6.12
2 - Roof Flanges @ \$1.25 each	2.50
125 lbs of lead @ \$.11 per lb.	<u>13.75</u>
Total	\$97.73

Material Required for Hot and Cold
Water Lines

180'	2" Gal. Pipe	¢ $\frac{1}{4}$	.25 Per ft.	\$ 45.00
100'	1½" Gal. Pipe	¢	.19 Per ft.	19.00
75'	1" Gal. Pipe	¢	.12 Per ft.	9.00
300'	¾" Gal. Pipe	¢	.09 Per ft.	27.00
250'	½" Gal. Pipe	¢	.07 Per ft.	17.50
4 -	2" Gal. Elbows	¢	.40 Each	1.60
10 -	2" Gal. Tees	¢	.75 Each	7.50
5 -	2" Gal. Unions	¢	1.09 Each	5.45
6 -	2" x 2" x ¾" Tees	¢	.60 Each	3.60
12 -	2" Gal. Nipples	¢	.16 Each	1.92
1 -	2" Gate Valve	¢	5.00 Each	5.00
4 -	1½" Gate Valve	¢	4.50 Each	18.00
16 -	1½" x 1½" x 1" Tees	¢	.45 Each	7.20
16 -	1½" x 1½" x ¾" Tees	¢	.45 Each	7.20
12 -	1½" Gal. Tees	¢	.45 Each	5.40
10 -	1½" Gal. Elbows	¢	.35 Each	3.50
10 -	1½" Gal. Unions	¢	.80 Each	8.00
6 -	1½" Gal. Plugs	¢	.15 Each	.90
12 -	1½" x 4" Gal. Nipples	¢	.15 Each	1.80
20 -	1" Gal. Tees	¢	.26 Each	5.20
15 -	1" Gal. Elbows	¢	.24 Each	3.60
15 -	1" Gal. Unions	¢	.44 Each	6.60
20 -	1" x 6" Gal Nipples	¢	.11 Each	2.20
15 -	1" Close Nipples	¢	.07 Each	1.75
Carried Forward				\$ 213.92

Pipe Fittings (Cont.)			\$213.92
10 - 1" Short Nipples	@ \$	.08	\$.80
10 - 1" Gal. Plugs	@	.08	.80
10 - 1" Street Elbows	@	1.10	1.10
6 - 3/4" x 1/2" Gal. Elbows	@	.15	.90
50 - 3/4" x 3/4" x 1/2" Tees	@	.14	7.00
40 - 3/4" Gal. Unions	@	.41	17.60
35 - 3/4" Gal Tees	@	.12	4.20
30 - 3/4" Close Nipples	@	.06	1.80
30 - 3/4" x 4" Nipples	@	.06	1.80
20 - 3/4" Gal. Plugs	@	.05	1.00
40 - 1/2" Gal. Elbows	@	.09	3.60
50 - 1/2" Gal. Tees	@	.11	5.50
30 - 1/2" Gal. Unions	@	.26	7.80
30 - 1/2" Street Elbows	@	.09	2.70
20 - 1/2" Close Nipples	@	.05	1.00
20 - 1/2" x 3" Nipples	@	.05	1.00
20 - 1/2" x 4" Nipples	@	.05	1.00
20 - 1/2" x 6" Nipples	@	.07	1.40
Total			\$ <u>274.92</u>

Labor For Roughing In
Plumbing

The labor for roughing in plumbing is estimated as
70 Per Cent of the cost of the roughing in materials. The
total costs roughing in all plumbing materials is \$ 909.31

The labor for roughing in plumbing \$ 636.52

Costs of Plumbing Fixtures

28 -	Water closets with flush valve	@ 35.00	Each	\$ 980.00
41 -	Lavatories	@ 15.00	Each	615.00
16 -	Showers stalls	@ 40.00	Each	640.00
3 -	Urinals	@ 20.00	Each	60.00
4 -	Laundry Tubs	@ 15.00	Each	60.00
1 -	Sump pump	@ 50.00		50.00
Total				\$ 2405.00

Costs of labor for installation of plumbing fixtures
at 25 % of the costs of the fixtures \$ 601.25

Costs of automatic gas water heater complete \$ 275.00

Heating Requirements

The men's and women's rooms require ten wall type radiators 55 sq. ft. of radiation each a total of 550 sq. ft. The radiators are 28 $\frac{1}{2}$ " high and 66 $\frac{1}{2}$ " long with 1 $\frac{1}{4}$ " steam inlets.

The office requires one radiator of 36 sq. ft. radiation Use a three tube radiator 23" high and 31 $\frac{1}{2}$ " long, tapped for 1 $\frac{1}{4}$ " steam pipe.

For the store room use wall type radiator requiring 16 sq. ft. radiation which are 21 $\frac{1}{2}$ " high and 26 $\frac{1}{4}$ " long and which are tapped for 1" steam pipe.

The basement and laundry room will have five radiators each of 24 sq. ft. radiation,. Use wall type radiators 21 $\frac{1}{2}$ " high and 40" long, tapped for 1" steam pipe.

Pipe and Fittings Necessary For Heating

40' - 4" Black pipe	@ \$.50 per ft.	\$ 20.00
40' - 3" Black pipe	@ .40 per ft.	16.00
40' - 2" Black pipe	@ .20 per ft.	8.00
35' - 1 $\frac{1}{2}$ " Black pipe	@ .14 per ft.	4.90
70' - 1" Black pipe	@ .09 per ft.	6.30
6 - 4" 90° Elbows	@ 1.25 each	7.50
4 - 4" Nipples	@ 1.00 each	4.00
2 - 4" Unions	@ 1.75 each	3.50
2 - 4" x 4" x 1" Tees	@ 1.40 each	2.80
2 - 4" x 3"x 1" Tees	@ 1.35 each	<u>2.70</u>
Total		\$ 75.70

Pipe Fittings (Cont.)

	Brought Forward	\$ 75.10
2 - 3" 90° Elbows	@ \$.90	1.80
2 - 3" Unions	@ 1.25	2.50
2 - 3" x 3" x 1½" Tees	@ .80	1.60
2 - 3" x 3" x 1" Tees	@ .80	1.60
2 - 3" x 2" x 1½" Tees	@ .80	1.60
2 - 2" x 2" x 1" Tees	@ .54	1.08
2 - 2" x 1½" x 1½" Tees	@ .54	1.08
2 - 1½" 90° Elbows	@ .25	.50
2 - 1½" x 1½" x 1" Tees	@ .37	.74
2 - 1½" x 1½" x 1½" Tees	@ .37	.74
12 - 1½" Unions	@ .40	4.80
2 - 2" Unions	@ .85	1.70
2 - 3" Unions	@ 1.00	2.00
10 - 1" Unions	@ .29	2.90
12 - 1½" Close Nipples	@ .11	1.32
10 - 1½" 90° Elbows	@ .20	2.00
12 - 1" 90° Elbows	@ .14	1.68
Total \$		<u>105.34</u>

The Costs of Heating System

1 - 3 Tube radiator 23" x 31½"	\$ 21.60
10 - Wall Radiators 28½" x 66½"	264.00
10 - Wall Radiators 21½" x 40"	102.00
1 - Wall Radiator 21½" x 26½"	8.16
1 - Gas-Fired Boiler of 1170 Sq. H. Radiation	360.00
Fittings for Radiators	
11 - 1½" Steam Radiator Valves @ \$ 2.25	24.75
11 - 1" Steam Radiator Valves @ 1.75	19.25
22 - Air Valves for Steam Radiator @ .75	<u>16.50</u>
Total	\$ 816.26

The Labor Costs of Connecting Steam System

The average costs for a steam system over 1000 sq.ft.

radiation is \$14.00 for each radiator	\$ 308.00
The labor costs of installing boiler	<u>30.00</u>
Total	\$ 338.00

The Costs of the Brick Chimney Lined with 12" Drain Tile

Require 26' of 12" Drain Tile	\$ 8.00
Labor setting Flue Lining	\$ 4.50
Labor for Setting Brick Chimney	15.00
Requires 800 Common Brick	16.00
Requires 152 Finish Face Brick	4.56
Requires 16 cu. ft. of Mortar	<u>2.00</u>
Total	\$ 50.06

Costs of Wiring for Electric Fixtures

46 - Ceiling outlets	@ \$ 2.75	\$ 126.50
46 - Bracket Outlets	@ 3.25	149.50
9 - Switches	@ 3.25	29.25
Costs of 200 Amp Service		<u>75.00</u>
		\$ 380.25

Costs of Lighting Fixtures

Basement

8 - Fluorescent Ceiling Lights @ \$10.00	\$ 80.00
16 - Duplex Plugs @ .40	6.40
4 - Switches @ .40	1.60
2 - Outside Night Lights @ 2.50	5.00

Main Floor

14 - Duplex Plugs @ .40	5.60
20 - Fluorescent Ceiling Lights @ 10.00	200.00
16 - Porcelain Ceiling Fixtures @ .40	6.40

Office and Store Room

1 - Fluorescent Ceiling Fixture @ 10.00	10.00
1 - Porcelain Ceiling Fixture @ .40	.40
5 - Switches @ .40	2.00
4 - Duplex Plugs @ .40	1.60
10 - Outside Night Lights @ 2.50	25.00
Labor installing fixtures	<u>12.00</u>

Total \$ 347.00

Cost of Building

Cost of Excavation	\$ 267.50
Cost of Footings	79.73
Cost of Basement Floor	182.50
Cost of Concrete Stairway	27.25
Costs of Basement Windows--Aera-ways	40.25
Costs of Concrete Wall--Material and labor for Basement	458 .00
Costs of Cinder Block Wall above ground, Material and Labor	747.00
Water and Damp Proofing, Below Grade	169.00
Costs of Steel Floor Joists	690.50
Costs of Concrete Floor	484.00
Costs of Steel Sash	125.75
Cost of framing Ceiling and Partition including Material	245.60
Costs of Interior Plastering	378.95
Costs of Exterior Plastering	333.50
The total costs of Roof	366.13
Costs of Metal Lathing	215.66
Costs of Concrete Cap on Wall	44.85
Concrete Beams over Windows	65.25
Costs of Doors and Trim including Labor	425.26
Cost of Interior Carpenter Work	154.90
Costs of Interior Painting	306.90
Plumbing Material for Drains and Sewer Lines	634.39
Plumbing Material for Hot and Cold Water	<u>274.92</u>
Carried Forward	\$ 6717.79

Cost of Building (Cont.)

Brought Forward	\$6717.79
Labor roughing in Plumbing	636.52
Cost of Plumbing Fixtures	2405.00
Labor setting Plumbing Fixtures	601.25
Costs of Pipe and Fittings necessary for the heating system	105.34
Costs of Heating Equipment	816.26
Labor costs for Installation of Heating System	338.00
Cost of Automatic Hot Water Heater	275.00
Costs of Chimney	50.06
Costs of Wiring	380.25
Costs of Electric Fixtures	347.00
Costs of Labor Installing Electric Fixtures	<u>24.00</u>
Total	\$12,512.40
15% Added for Overhead and Profit	<u>1,876.80</u>
Total Costs of Building	\$14,389.20

GRADING AND SEWER DESIGN

DESIGN OF SEWER SYSTEM

From Man- hole	To Man- hole	Dist. ft.	Slope	Vel. f.s.	Capacity	Invert Elev.	
						Upper M.H.	Lower M.H.
1	2	94	.012	2	.14	95.23	94.20
3	2	64	"	"	"	94.97	94.20
2	10	102	"	"	"	94.20	92.97
8	10	76	.006	"	.40	93.03	92.97
5	8	39	.006	"	"	93.27	93.05
4	5	76	.012	"	.14	94.18	93.27
6	5	136	"	"	"	94.90	93.27
11	10	116	"	"	"	94.36	92.97
7	8	130	"	"	"	94.59	93.03
9	8	54	"	"	"	93.68	93.03
10	12	112	.006	"	.40	92.97	92.30
13	12	72	.012	"	.14	93.16	92.30

DESIGN OF SEWER SYSTEM

From Man-hole	To Man-hole	Dist. ft.	Slope	Vel. f.s.	Capacity	Invert Elev.	
						Upper M.H.	Lower M.H.
12	14	35	.006	2	.40	92.30	91.97
15	14	150	"	"	"	92.87	91.97
16	15	120	.012	"	.14	93.41	91.97
17	16	120	"	"	"	94.85	93.41
18	15	192	"	"	"	94.27	93.41
14	19	74	.006	"	.90	91.97	91.52
19	23	41	"	"	"	91.52	91.27
20	19	103	.012	"	.14	92.76	91.52
21	19	80	"	"	"	92.48	91.53
22	23	114	"	"	"	92.64	91.27
24	23	86	"	"	"	92.30	91.27
23	Tank	40	.006	"	.90	91.27	91.03

ESTIMATE OF CUT AND FILL

Area Sq. Inches	Area Sq. Feet	Average Fill ft.	Cubic Yds Fill	Average Cut ft.	Cubic Yds. Cut
2.47	3960	2.0	293		
5.58	8910	1.0	330		
4.87	7800	1.5	430		
29.08	41600	.5	770		
8.40	1340	.5	25		
.91	1450	.5	28		
1.00	1600	1.0	30		
.72	1150			.3	11
4.65	7450	1.0	276		
1.60	2560			1.0	95
1.80	2880			.5	54
TOTAL			2182		160

Excavation of basement = 428 yds.

Dirt to be bought = 1600 yds.

COSTS OF GRADING AND SEWER

Estimated Costs of Grading

Required to buy 1600 yds of fill @ \$.50 yd.	\$ 800.00
For rough grading use Bull-Dozer	
Requires 4 days @ \$5.00 per hour	160.00
Requires the removal of top soil in road-ways	
with team scraper @ \$.30 per yd.--200 yds.	60.00
Requires a road grader for one days work @ \$10.00	
per hour to form a large crown of 1" per ft.	
for gutters	80.00
Requires 1500 yds of road gravel @ \$.75 per yd	<u>1125.00</u>
Total	\$2225.00

Costs of Sewer System

1604 ft. of 4" V.P. Sewer Tile @ \$.19 ft.	\$ 304.76
390 ft. of 6" V.P. Sewer Tile @ .27 ft.	105.30
152 ft. of 8" V.P. Sewer Tile @ .39 ft.	119.28
2000 ft. of 4" Drain Tile @ .02 ft.	40.00
220 ft. of 6" Drain Tile @ .04 ft.	8.80
100 - 4" V.P. "Y's" @ .70	70.00
100 - 4" V.P. Traps @ .80	80.00
20 - 6" x 6" x 4" Drain Tile "Y's" @ .40	8.00
There is 4,150 ft. of sewer trench--average depth	
of 3 ft. and width of 18". One laborer at	
\$.60 per hr. excavates 3 lineal ft. per hr.	830.00
Laborer setting tile @ \$.10 per lineal ft.	435.60
Labor for setting manholes @ \$1.50 each	42.00
Requires 26 Manholes--average depth 3'--Use 24"	
Reinforced concrete Tile for Manholes--	
Average cost including placement--\$4.00 each	<u>104.00</u>
Total	\$2148.74

Costs of Septic Tank

9000 Gallon Capacity

Excavation - 71 cu. yds.	@	\$.625 yd.	\$ 44.40
Requires 18.5 Cu. yds. concrete	@	6.00 yd.	87.00
There is 980 sq. ft. of concrete in contact with			
forms--Costs of lumber	@	\$.08 sq. ft.	78.40
Cost of labor to construct forms	@	104 sq. ft.	39.20
Cost for placement of Concrete			4.00
Cost of Steel Reinforcement			<u>20.00</u>
Total			\$273.00

Costs of Outside Water Supplies

Requires 4 frost-proof Water Hydrants	@	\$15.00 ea.	\$ 60.00
Requires 400 ft. of 1" Gal. Pipe			48.00
Requires 2-1" Gate Valves			5.00
Costs of 1" Fittings			10.00
Excavation of 400 ft. of Trench	@	\$.20 per ft.	<u>80.00</u>
Total			\$203.00

The Costs of Outside Wiring

Requires 6,330 Lineal ft. of No. 6 weather proof wire @ \$.05 per lineal ft.	\$ 316.50
Requires 32 Cedar Poles 22' long, may be bought from City of Lansing at \$5.00 each	160.00
Requires 100 5-amp. meters that may be bought used at \$5.00 each	500.00
Costs to wire each meter including metal meter box and fuse block---\$10.00 each	1000.00
Cost for setting light poles @ \$2.00 each	64.00
Requires 16 Night lights @ \$2.50 each	40.00
Requires 1240 ft. of No. 12 weather proof wire at \$.02 per ft.	<u>24.80</u>
	\$2105.30

Cost of Side Walks

It requires .375 bd. ft. of Lumber 2" x 4" for forms
of sidewalk to complete 1 sq. ft. of sidewalk
4' wide. There are 3,760 sq. ft. A sidewalk
4' wide requires 1370 bd. ft. lumber used twice
at \$20.00 per 1000 \$ 27.40

There are 1600 sq. ft. of 5' sidewalk. Requires
1/3 bd. ft. for forms, lumber used twice,
requires 533 bd. ft. @ \$20.00 10.66

Requires 67 cu. yds. concrete for sidewalks 4"
thick @ \$6.00 per yd. 402.00

Labor required to finish sidewalks (a Finisher and
helper complete 50 sq. ft. per hr.) @ \$1.75 per hr. 107.20

Total \$574.26

TOTAL COSTS OF TRAILER COACH PARK

Estimated Costs of Outside Work

Total costs of Grading	\$2225.00
Total Costs of Sewer System	2148.74
Costs of Septic Tank	273.00
Costs of Outside Water Supplies	203.00
Costs of Sidewalks	574.26
Costs of Outside Wiring	<u>2105.30</u>
Total	\$7502.30
Add 15% for Profit and Overhead	<u>1125.35</u>
Total	\$8627.65

Total Costs of Park

Building	\$14389.20
Outside Work	<u>8627.65</u>
Total	\$23016.85

[REDACTED]

1124 47.

Mar 3 '48

1124 47.

May 24 '56

Jun 25 '56

Nov 6 '57

1124 47.

~~1124 47.~~

[REDACTED]

Pocket empty.

11/09



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