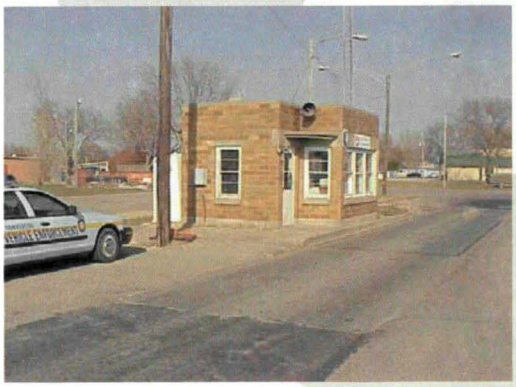
HISTORY AND DESIGN OF IOWA'S HIGHWAY MAINTENANCE AND WEIGHING FACILITIES

Iowa Department of Transportation
800 Lincoln Way
Ames, Iowa 50010



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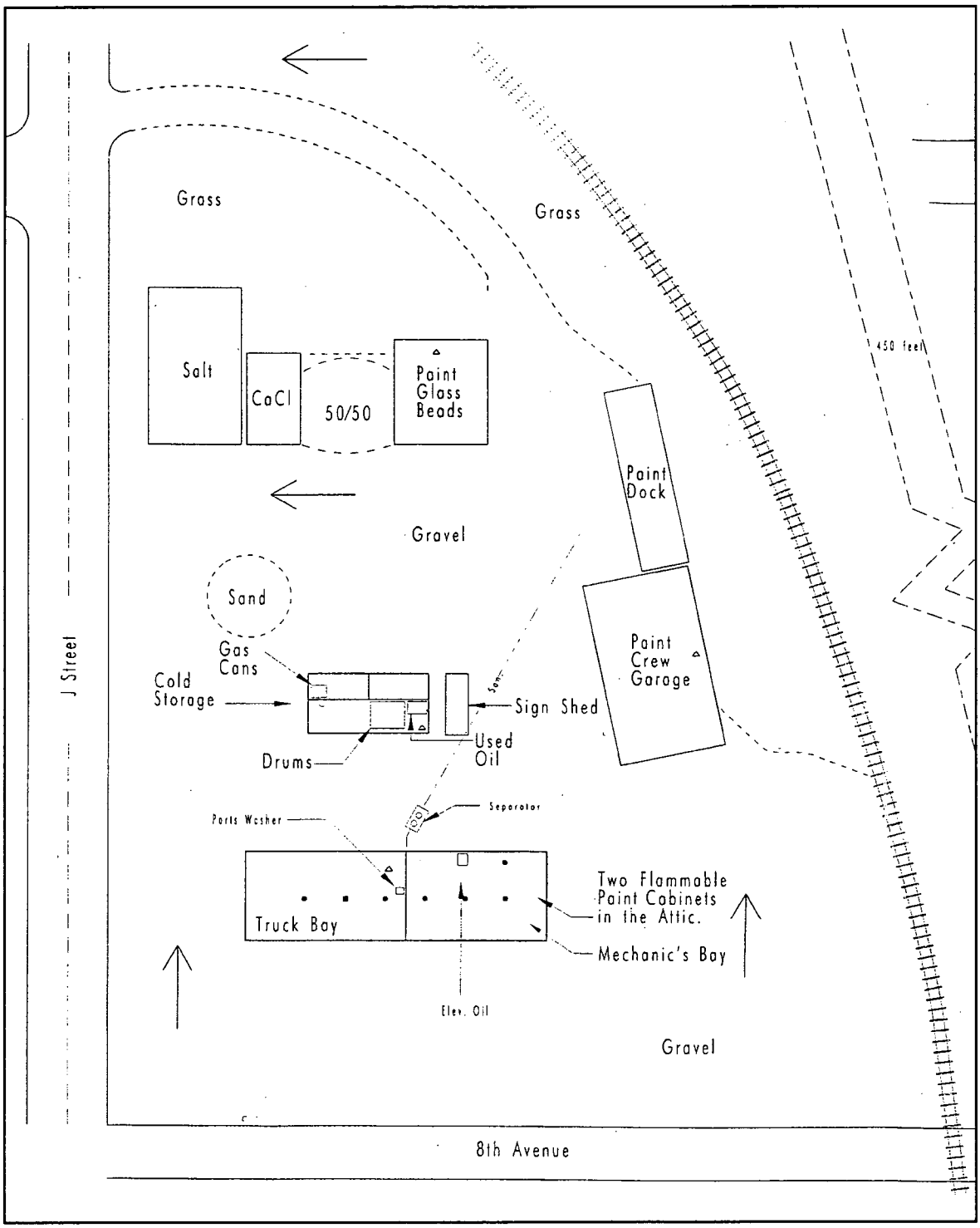
INTRODUCTION AND PROJECT BACKGROUND

In June 2001, the Iowa Department of Transportation announced the imminent closure and disposal of selected highway maintenance facilities as part of cost-cutting measures mandated by the Iowa legislature, an action that was to be completed by July 31, 2001. The DOT recognized that some of these facilities might be "historical sites," which in the Iowa Code are defined as any district, site, building or structure listed on the National Register of Historic Places or identified as eligible for listing in the National Register by the State Historic Preservation Office. Section 303 of the Code requires state agencies to "enter into an agreement with the Department of Cultural Affairs [in which the SHPO is located] to ensure the proper management, maintenance and development of historical sites." The DOT saw this disposal action as an opportunity to compile information about its highway maintenance facilities that could be employed in development of a management program for historic highway maintenance facilities in the future. Subsequently, the DOT authorized a similar study of highway weigh stations.

Maintenance Facilities

The Iowa Department of Transportation is responsible for the maintenance of the state's primary road system. Under the Department's Office of Maintenance, the state is divided into six districts, each headed by a District Engineer. Each district is divided into four maintenance "residencies," and each of these residencies is further divided into highway maintenance areas containing one or more maintenance facilities. These facilities, generally situated on the outskirts of a community, consist of several acres of land; a building with small office; space for assembly of crews and bays for equipment repair and storage; a variety of sheds; and lay down areas for bulk materials such as sand and gravel. However utilitarian in aspect, these facilities are among the most visible manifestations of a process of centralization of authority over Iowa's roads that began in 1884.

The most important factor in determining the locations of maintenance facilities was how far work crews could travel from a facility to a work site and not spend too much of the work day in transit. A related factor was what is called "cycle time": the interval between one complete performance of an action and the next. As it happened, the grid-like arrangement of Iowa counties, the regular spacing between many county seats, and the fact that the roads connecting county seats and other major "market centers" were on the primary system facilitated location of maintenance garages in or near those communities. Additional garages could then be established as necessary to fill in "gaps" created in areas where the county seat was not centrally located, or the county dimensions were significantly longer east-west than north-south (for example Clinton, Pottawattamie, Plymouth) or it was necessary to build new facilities for interstate maintenance. The size of the facility (number of crew and amount of equipment, and thus number of bays on the garage) would depend primarily on how many miles of road, and what kinds of road, were serviced by each facility. Over the decades, snow removal and the scale of demand for this service became the major factors in decision-making with regard to facility location.



Site Map of Charles City Maintenance Facility (*Iowa Department of Transportation, Ames)*

The principal building at a maintenance facility is the garage, which incorporates some office space, stalls for vehicle storage and repair, space for work crews to assemble, and miscellaneous storage. Associated buildings generally include sheds for storing salt, and equipment, and may also include storage and office areas for paint crews. One or more circular facilities for storage of liquids (brine) are also common. The immediate setting of these buildings is a large paved or graveled space, optimally about 6 acres, for vehicle parking and open storage of bulk materials such as sand or gravel.

These buildings are almost uniformly built from standardized plans generated by the state highway department and adapted as necessary to the particular location. They may have rectangular or L-shaped footprints. Each garage contains an office, crew area, and from two to 19 or more vehicle stalls.

Weigh Stations

Weigh scales and weigh stations, much like highway maintenance facilities, have long been a fixture on the state's primary roads. First introduced on a temporary basis in Iowa in 1917 as part of a study conducted by the Good Roads section of the University of Iowa's Engineering Experiment Station, and later appearing as permanent highway installations, traffic weighing points are utilized not only to monitor truck drivers' loads to make sure they remain within legal parameters, but to gauge use of and wear on various roads. Strategically situated near points-of-entry to the state or adjacent to the intersections of major arteries, weigh stations are a long-standing and quickly recognizable feature of the interstate system. Typically, weighed stations are comprised of one building, chiefly utilized as administrative space, and one or a combination of the following types of weighing technology:

Chronology of early Loadometer design (*Loadometer Corporation*)

Portable Scales: Several types of portable scales are in use today, but the oldest and perhaps most popular is the Loadometer. In 1919, Black & Decker introduced the first Loadometer, a simple device with a 15,000 lb. capacity consisting of a jack to raise the wheel and a dial to display a vehicle's weight. In the mid-1920s, the "Drive-on Loadometer" was introduced. Carrying the same load capacity as the original, the "Drive-on" allowed drivers to pull onto a scale placed on the ground, which measured each axle load as the driver passed over the scale. In the late-1920s, the design was again improved when the "Turtleback" increased load capacity to 20,000 lbs. From 1939

to the mid-1980s, the mechanical "Type A" Loadometer was manufactured, and many of these models remain in use (Loadometer Corporation 2002). Current Loadometer designs reflect a need for space and time efficiency, and at least one version employs weigh-in-motion technology.

Permanent scales: These most often take one of two forms: load-cell systems or bending-plate systems. Steel or concrete load-cell systems usually stand aboveground, and as vehicle passes over it either tension or compression rates are measured to calculate load. Bending-plate systems employ metal plates placed flush with the pavement. Tension sensors in the plates are used to calculate weight as vehicles pass over them.

Weigh-in-Motion (WIM): Early WIM stations employed a series of sensors embedded in a sensor pad, which calculate the weight-per-axle as trucks drive over the pad at speeds as high as 70 mph. These sensors were often inaccurate and needed to be recalibrated frequently, and WIM now commonly uses a bending-plate or piezo-electronic (ceramic, electricity generating strips) system. Widely used throughout the United States, Canada, and Europe, the WIM system dramatically reduces the amount of time necessary to process individual vehicles. Currently, there are 3 WIM stations in Iowa that utilize the bending plate system for weight enforcement and 17 additional WIM stations that collect research information on more than 80 million vehicles per year.

PrePass: Begun in 1996 and usually used in conjunction with WIM, the PrePass program allows participating commercial vehicles to bypass weigh stations altogether. After the vehicle travels over the WIM sensors, PrePass utilizes an automatic vehicle identification (AVI) system—a transponder located on the dashboard—to electronically transmit information normally provided at the weigh station. In Iowa, 5 PrePass locations, located at points-of-entry on I-35 and I-80 as well as at the interception of the two interstate highways, are presently in use. Only 2 of these locations currently combine PrePass and WIM technology.

THE EVOLUTION OF MAINTENANCE FACILITY AND WEIGH STATION DESIGN

From the establishment of Iowa's first counties and townships, control over road building and maintenance had rested chiefly with local government units. In the 19th century, state law accorded Iowa counties the power to locate roads, reroute existing roads, and levy taxes for the repair of bridges. The trustees of the townships within each county determined the amount of tax to be levied on property for road and bridge repair, and also the extent to which residents could pay their taxes in labor rather than cash. Because many cash-poor farmers preferred to work off their tax obligations, road repair was generally scheduled for late summer or early fall, after the harvest. Trustees divided their townships into multiple road districts, each headed by an elected supervisor who had authority to expend funds and direct the labor of those working off their tax obligations (May 1965: 82; Thompson 1981: 71).

The first effort to end this highly localized (and locally popular) arrangement occurred in 1884, when the Iowa legislature authorized county supervisors to establish county-controlled road

funds supplied by a one-mill per dollar property tax. The same law permitted township trustees to organize the township into a single road district, upon petition of a majority of the voters. However, few counties levied the tax, and township trustees continued to divide their townships into multiple road districts. Although the legislature made the one-mill county tax mandatory in 1900, it had no discernable effect on the traditional pattern of road administration in the state, and taxpayers were still permitted to work off their taxes in lieu of cash payments (May 1965: 84).

Passage of the "Anderson Law" in 1902 forced the adoption of one road district per township and made payment of the one-mill tax in cash compulsory, yet road administration remained captive to township interests. A state highway department was established at Iowa State College in 1904, but its role was largely educational and it had no regulatory authority. Not until 1913 and through the extensive efforts of the Good Roads Association were further changes made to the system of road administration in Iowa. Legislation of that year reorganized the State Highway Commission and granted it additional power, and also increased the power of county supervisors. The newly created county road system, to be under complete control of the supervisors, was to include all "main traveled roads," estimated as between 10 and 15 percent of a county's total road mileage (May 1965: 88-90).

Under the newly empowered State Highway Commission, road administration became increasingly professionalized and centralized. Under the Commission's Chief Engineer, the Field Department divided the state into five districts (four containing 20 counties, the fifth containing 19) and appointed an engineer to administer each. The districts were drawn by grouping together counties that could be easily reached by railroad from a central point — the central point thus becoming the "convenient place" where the district headquarters would be established. An important early responsibility of the Field Department and the district engineers was to explain the new (1913) road law to the general public. The department's staff also examined bridge sites for new construction, attended bridge lettings, inspected and supervised bridge construction, and investigated complaints (Iowa State Highway Commission 1913: 35-36; Thompson 1981: 94).

The State Highway Commission's efforts were strengthened by the federal government, which in 1916 required federal aid to be matched 100% with state funding in a special primary road fund. States that accepted federal road aid were also required to select the roads on which federal funds would be used. To this end, the State Highway Commission organized Iowa's roads into three classes: township roads (approximately 88,000 miles), county roads (approximately 10,000 miles) and "Inter-county" roads (approximately 6000 miles). In subsequent legislation formalizing the classification of Iowa's roads, the number of classes was reduced to just two: primary roads (basically the "inter-county" roads connecting every city and town of over 1000 population) and secondary roads (all other roads, including county and township roads) (Iowa State Highway Commission 1918: 18; May 1965: 92-93).

Although traffic weighing as a method of evaluating wear on Iowa's roads was introduced concurrently with this new road legislation, the earliest documented use of statewide traffic weighing in Iowa was not a State Highway Commission-funded project, but rather a 1917 traffic

study conducted by the Good Roads section of the University of Iowa's[1] Engineering Experiment Station. Where later State Highway Commission traffic studies were primarily concerned with determining the rate of through v. local traffic and what types of vehicles were on the road (most commonly classified as trucks, passenger motor vehicles and horse drawn), the Engineering Experiment Station took this evaluation of road use one step further and began weighing vehicles. Results of a study titled "Traffic on Iowa Highways" were published in early 1920, and the express goal of the endeavor was to compile data on the relative weight of each class of vehicle, under the premise that "any satisfactory method comparing the economy of various types of road surface should take into account the weight of traffic as one of the factors of comparison (Agg 1920)."

The Engineering Experiment Station survey took place between June and September 1917, and identified four weight classes: horse drawn passenger vehicles, horse drawn freight vehicles, passenger automobiles, and motor trucks. Traffic was stopped at seven stations in five counties (three in Story, and one each in Linn, Woodbury, Delaware and Webster) and weighed on "ordinary pitless type" scales. Unsurprisingly, the survey determined that the majority of traffic on Iowa's roads was passenger automobiles. The temporary weigh-stations were situated near the intersections of primary roads, and tents were erected to provide shelter and storage space for the surveyors and their equipment. T.R. Agg, author of a companion 1920 analysis of survey results, proved prescient in his prediction that motor truck traffic would dramatically increase as roads were improved, and that truckers would likely continue to increase the weight of their

The 1917 Engineering Experiment Station Traffic Survey, outside of Ames, Story County
(Iowa Department of Transportation.

[1] Then known as the Iowa State College of Agriculture and Mechanic Arts.

loads as well. Agg stressed the need for legislation regarding load limitations "before an extensive system of surfaced highways is constructed, to insure that the roads actually built will be adequate for the maximum loads permitted (Agg 1920)." The report concluded that the tonnage of traffic in Iowa was much higher than estimated, and was expected to increase as the predominantly dirt and gravel roads were replaced with paved arteries. Significantly, the study reported limited interstate traffic, except at the state line, which its author felt "ought to set to rest the idea that highways are being constructed primarily for the use of tourists (Agg 1920)."

In 1919, the State Highway Commission established a Department of Road Maintenance, headed by former district engineer W. H. Root. This department was responsible, effective July 1, 1920, for maintenance of the state's primary road system. Through the district engineers (by then increased to nine), the state funded and supervised maintenance activities that were actually performed under the authority of county supervisors (Iowa State Highway Commission 1919: 11; 1920: 11). Endeavoring "to have all necessary maintenance work performed promptly," the Department of Road Maintenance issued "maintenance letters" to district and county engineers throughout the year. In early spring, for example, a maintenance letter might focus on sub-grade failures. Another in midsummer would remind engineers of the need to keep weeds along primary roads cut back. In October would come a reminder that gravel roads needed to be "crowned up" in anticipation of winter (Iowa State Highway Commission 1922: 118).

The Federal Aid Highway Act of 1921 further centralized highway administration at the state level. State and interstate highways were to be formally designated, and state highway commissions were required to have direct control over all roads built or maintained with primary road funds. Initially reluctant to cede so much influence to the federal and state governments, the Iowa legislature did not grant full control over the state's entire primary road system to the Highway Commission until passage of the Schaff Act in 1927 (Anonymous 1963: 93-95).

Paullina maintenance garage, 1930 *(Iowa Department of Transportation)*

With the Schaff Act, the state took over, physically as well as administratively, full responsibility for maintaining Iowa's primary road system. The Department of Road Maintenance thereupon began a program to build facilities for the vehicles, equipment, materials and crews that under the supervision of the District Engineers and their designated superintendents would be deployed in the maintenance of the state's ever-expanding primary road system. Each facility was composed of a garage of two or more bays (averaging approximately 3240 square feet) for vehicles and equipment, open laydown areas for materials such as sand and gravel, and, over time, an assortment of wooden storage sheds. Some of these facilities also included office buildings for district maintenance superintendents. By the close of 1928, the Commission reported 66 garages and ten office buildings completed or under construction, distributed among 54 counties (Iowa State Highway Commission 1928: 6). The garages, of structural clay tile with concrete floors, asphalt shingled roofs, and wooden doors cost an average of $4500 each, the office buildings, also of tile, $2500 each. During 1929, an additional 16 garages were completed or in process, as were two more maintenance superintendent's offices. By the end of 1930, there were 98 garages and 12 office buildings, in 93 counties. The numbers continued to increase, until in 1937 there were 126 garages and 13 offices in 98 counties (Iowa State Highway Commission 1929: 7; 1930: 7; 1937:10).

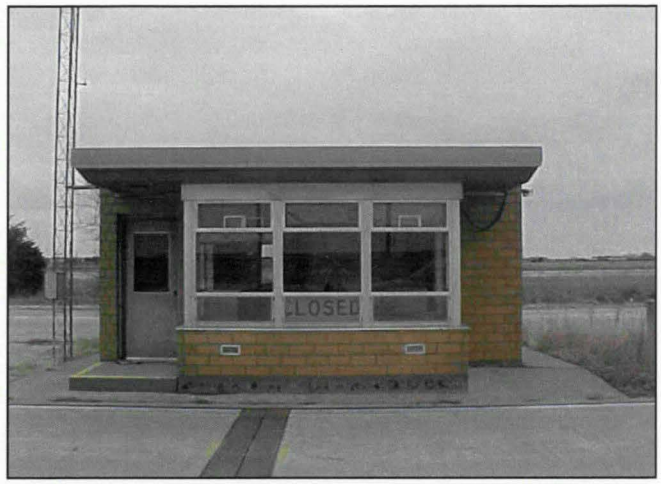
During this time period, increased truck traffic undoubtedly exacerbated wear on the roads and put the facilities to good use. State Highway Commission reports from the 1920s show a slow increase in truck travel in Iowa: in 1919, 4.89% of total traffic was trucks, and by 1926 this had risen only 2-1/2% (to 7.4%) (Iowa State Highway Commission 1919, 1926). By the mid-1930s, however, the state decided to launch its own traffic weighing survey, primarily to obtain data on which to base budgetary requirements for road maintenance and improvement and to determine when and where traffic was the heaviest (Iowa State Highway Commission 1939). The survey suggested that approximately 20% of vehicles on the road in 1937 were trucks—a 13% increase in 10 years (McLarnan 1937). Between April 1936 and April 1937, the state undertook what appears to be the first state-sponsored comprehensive traffic survey in Iowa, deemed the "Statewide Planning Survey." Traffic weighing was integral to the data collection process, and 90 Loadometer stations were distributed throughout the state. Five five-member "Loadometer parties" were supplied with two Black and Decker Loadometers per party, most likely the Turtleback design, and operated a circuit of 18 weigh-in points for a 26-day period. Fourteen of these 26-day cycles were completed over the course of the year, along with nighttime Loadometer parties at 37 of the 90 weigh stations (Iowa State Highway Commission 1939). As the operation itself was transitory, there were no permanent buildings or structures associated with the state's first traffic weighing endeavors; rather, tents were likely used as in the Engineering Experiments Station survey 20 years earlier.

Following the 1937 conclusion of the survey, Loadometer party chiefs were asked to provide written reports of their observations and analysis of the success of the weighing program. These informal reports were filled with indignation over flagrant violation of both the spirit and letter of the law regarding truck transit and load limits, as well as recommendations for new legislation to protect the roads from excessive wear. Party chief Charles Richter reported that one truck, loaded well over the 16,000 lb.-per-axle limit, caused a 12', half-moon shaped crack in the

pavement near the weigh station (Richter 1937). Some of the Loadometer party chiefs' concern centered on safety issues: overloaded axles, worn brakes and shoddy tires posed a serious threat to the truck drivers themselves as well as to passengers in other vehicles on the road. But it was out-of-state license plates, particularly those from neighboring Missouri, which elicited the strongest and most consistent reaction from surveyors. Each driver was required to fill out Origin and Destination cards while their vehicle was weighed, providing the surveyors with a rough idea of how many miles of Iowa roads each vehicle would travel. In theory, this would have provided the information necessary to estimate the amount of gas each vehicle would purchase while in transit, and hence the potential revenue to be gained through the state gas tax. What the surveyors found, however, was that most out-of-state trucks carried auxiliary gas tanks and thus bypassed Iowa gas stations completely. The party chiefs were outraged: Carl Schach referred to the "hoards" of Missouri trucks passing through Iowa without contributing (via the gas tax) to the maintenance of the highways that they "so completely used (Schach 1937)." Schach speculated that over $100,000 was lost in gasoline tax each year.

Trucks owned by Iowa-based companies but licensed in Missouri, where licenses were procured comparatively inexpensively, were also a source of contention. The party chiefs reported that trucks with out-of-state license plates but owned by Iowa companies were the most egregious violators of the load limits. Schach rather dramatically decried this practice, writing, "since they had already violated [Iowa license laws]. . .without any serious result or effect upon themselves, they felt they could, also, justly disregard the laws of our state with relation to the loads they hauled (Schach 1937)." He continued with a list of the companies he believed to be in most flagrant violation of the state regulation, and then recounted a tale of a truck line owner who had ordered his trucks to park a few miles away from the weigh station and wait until after 10 p.m., when the survey party left for the evening, to avoid being weighed and possibly fined for weight violations. Other party chiefs recorded the same phenomena, albeit less colorfully.

Clarinda maintenance garage, 1942 *(Iowa Department of Transportation).*



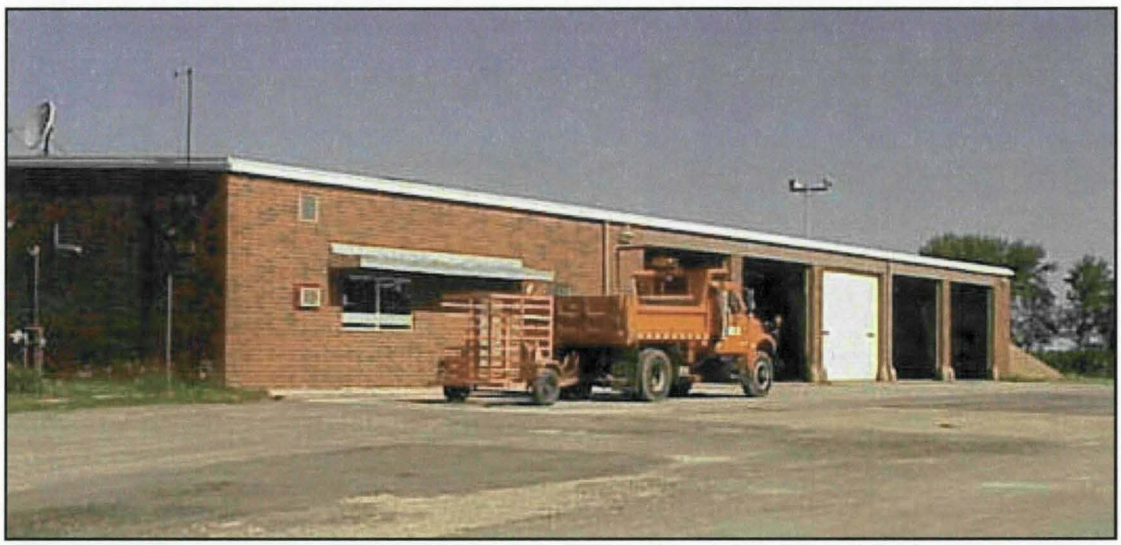
Muscatine weigh station, 1955
(*Iowa Department of Transportation*)

While traffic weighing initiatives were still in their formative years, the program to establish maintenance facilities had basically achieved buildout by World War II, and with diversion of material, funding and manpower to the war effort only six facilities were constructed during the 1940s, all between 1940 and 1942 (Wilbur Smith Associates 1989: 2-20) Report). The garage at Clarinda eschewed the earlier colonial revival style in favor of a more "Moderne" aspect. It was a three-stall tile building with flat roof, face brick on the main façade, and large multilight industrial windows at the office end. On the other hand, a 1941 two-stall addition to the Traer garage utilized the dormered design from the early 1930s (Iowa DOT: Facility Maintenance Building and Site Inventory Form for Traer Garage, n.d.).

In the 1950s a new element was added to maintenance facilities. The State Highway Commission began using rock salt on highways in 1954, necessitating the erection of enclosures in which to store the material (Iowa State Highway Commission 1960: 42). The salt sheds were visually distinctive although of relatively small scale. They were constructed of wood, with exposed studs. The plank cladding was installed on the interior surface of the studs so that salt could be removed mechanically or by hand labor without the need to work around the studding. Examples include those at Corydon, Clarinda, Hamlin, and Oelwein.

The Highway Commission continued to use its "traditional" garage designs for the few built during the 1950s, including a new garage at Dubuque and an addition to the Blairstown garage (Dubuque Telegraph Herald 1958: 28, in Crawford 1963; Iowa DOT: Facilities Maintenance Building and Site Inventory Form for Blairstown Garage). It was also in the 1950s that the first permanent weigh stations were constructed along Iowa's primary roads. In 1955, at least five permanent weigh stations were established (in Charles City, Le Mars, Slone, Muscatine and Mechanicsville) and a sixth was constructed in Worth County in 1956. The installation of

Colfax maintenance garage, 1962/2000 *(Iowa Department of Transportation).*



Guthrie Center maintenance garage, 1973 *(Iowa Department of Transportation)*

permanent scales (commonly bending-plate systems) was accompanied by the construction of tile buildings to shelter surveyors. The weigh stations were situated along heavily traveled highways and near points-of-entry to the state, and reached via easy-off-and-on access roads. The weigh station buildings from the same period, exemplified by Le Mars, Muscatine and Charles City, were irregularly massed with tile walls, poured concrete foundations, and flat or front-gabled roofs. Banks of windows were employed not only to light the interior of the buildings, but, as is common in mid-century architecture, to provide discontinuity in the otherwise uncomplicated façade design.

By 1960, Iowa's portions of the "National System of Interstate and Defense Highways" were well underway. The state's primary road system was also expanding in another way, through construction of so-called "relief routes" that rerouted highways around selected cities and towns. Such bypasses became increasingly necessary as more and more Iowans employed autos more frequently, and as more trucks took over from railroads the hauling of freight (Iowa State Highway Commission 1959: 7). For the state's highway maintenance program, such developments required expansion and in some cases major overhaul of maintenance facilities. As the various segments of Interstates 80, 35 and 29 were completed; the State Highway Commission either replaced buildings at existing locations or relocated operations to sites more convenient to the interstates (Iowa State Highway Commission 1965: 10). Between 1960 and 1979, Iowa built no fewer than sixty-three new maintenance garages to physically replace or functionally supplant facilities erected in the 1920s and 1930s (Wilbur Smith Associates 1989: 2-20). During the 1960s, new garages, such as one at Colfax, featured a brick-faced, flat-roofed, box-like main block containing office, crew areas and two or three vehicle bays.

The small windows grouped in horizontal bands enhanced the streamlined character, and the flat canopies sheltered office entries. Attached to the rear of this block was a large steel-framed shed

with shallow gable roof, enclosing anywhere from 10 to 29 vehicles. No fewer than seven weigh station buildings were built in the 1960s, and their design was not dissimilar to the maintenance sheds: constructed of brick, rather than tile like their predecessors, they lack the smooth surfaces and clean lines of the "Moderne" 1950s buildings. Size, shape and massing, however, are consistent with the designs used in the previous decade.

Brandon weigh station, 1992
(*Iowa Department of Transportation*)

The civil defense aspect of the interstate program also provided a dividend in the form of radio communications. As of 1961, two-way radio systems had been made available for Highway Commission operations in five counties containing completed interstate segments. By 1964, work was well underway to provide radio communications among all the state's maintenance facilities (Unidentified newspaper clipping, November 24 1964, in Crawford 1963). In the following decade, office and stalls were once again subsumed under the same roof, this time an enormous steel-framed expanse with shallow gable roof supported on slender trusses. The end wall at the office end, and also the main façade, were clad with brick, while the wall at the garage end was painted concrete block. Depending on the number of stalls, these garages, which included those at Estherville, Cresco, Guthrie Center, and Harlan, ranged from 6,500 to 18,000 square feet. Much to the pleasure of the engineers and crew who were assigned to the new facilities, these garages featured insulated walls (Pearson 2000: 8).

The construction rate of weigh stations ebbed in the 1970s-1980s, but at eight new scale facilities were constructed between 1992 and 2001. Contemporary weigh stations mirror the asymmetrical, low-slung massing of earlier incarnations, but are of frame, rather than masonry, construction, and, like the 1960s construction, lack the sleek "Moderne" stylings of the earliest buildings. A typical building features wood siding, a concrete foundation, and vinyl windows. Hipped, rather than flat, roofs became common.

Modernization of Iowa's primary road maintenance facilities continued in the 1980s with yet another "generation" of garage designs. Ranging from 11,300 to 14,000 square feet, these buildings utilized prefabricated concrete "tilt-up" panel construction, and several featured "drive-throughs," with trucks entering from one side and existing from the other. (Pearson 2000: 8). By the close of this decade, during which garages of this type were built at Carroll, Marion, Sigourney, Denison and Chariton, among other locations, the Iowa Department of Transportation had demolished, sold, turned into satellite facilities, or otherwise disposed of nearly three-quarters of its original primary highway maintenance garages.

Carlisle maintenance garage, 1990s *(Iowa Department of Transportation)*

The 1990s saw still further evolution of maintenance garage design, with a slant-roofed, one-story office area centrally located between pairs of high-bay stalls, rather than at one end of a line of stalls. Ranging from 11,300 to 18,200 square feet, these garages also employed concrete panel construction. Each of the four areas into which these buildings are divided (office, storage, service, and wash) had separate climate controls, and the trucks are parked two to a bay, thereby fitting between 10 and 18 trucks into one garage (Pearson 2000: 9). Examples of this type include facilities at Anamosa, Carlisle, Le Mars, and Mount Ayr. This design has also been employed at the new (November 2000) maintenance facility at Charles City, which is the first example of a facility that is shared by several jurisdictions, in this instance the state, Floyd County, and Charles City (Anonymous 2001: 9).

Carroll maintenance garage, 1980s *(Iowa Department of Transportation)*

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