



**ELWOOD DRIVE / SOUTH FOURTH STREET  
RECONSTRUCTION AND SIGNALIZATION**

**Project Report #12**

**Ames, Iowa**

**August, 1993**

Since its original establishment in 1858 as the "Iowa Agricultural College," a school for higher education has existed just west of Ames in Story County. Subsequent expansion was spurred when the Morrill Act of 1862 provided land grants, the College of Veterinary Medicine was added in 1879, and academic divisions were mandated in 1913. After it became "Iowa State University of Science and Technology" in 1959, separate colleges later gained identity including those of Education (1968), Design (1978) and Business Administration (1984). With a current enrollment of 25,000, ISU is strongly committed to its land-grant heritage and changing needs of the 20th century.

above 48,000. While major campus development is concentrated north of Lincoln Way, extensive facilities have been located on the South Campus, housing Iowa State Center athletic/continuing education buildings and the Veterinary Medical College.



The city of Ames was founded in 1864 preceding the arrival of the Cedar Rapids and Missouri Railroad. From its modest beginning, enhanced by rail transportation, a university with emphasis on basic sciences and the "Lincoln Highway," Ames has grown to a 1990 population

In 1974 when traffic congestion generated by arterial travel, municipal service and university attractions overloaded Lincoln Way, the Iowa State Highway Commission adopted its Freeway-Expressway system and constructed relocated US 30 on an alignment to the south thereby bypassing Ames and the ISU campus. Although direct access was prohibited with certain exceptions, the main campus and surrounding residential area has been well served by an interchange to Elwood Drive. This 1.6 mi. arterial boulevard between Greenhills Drive just south of relocated US 30 and Lincoln Way was paved in 1973 of 8 in. Portland cement concrete (PCC) and consisted of two 25.5 ft. wide curbed roadways



roadways separated by a 19.0 ft. raised grass median. An intersecting undivided 0.75 mi. segment of South 4th Street from Beach Avenue east to Squaw Creek furnishes crosstown traffic service and access to parking areas for sports or educational purposes in Iowa State Center facilities. Present day traffic counts on Elwood Drive are:

- US 30 to So. 16th Street 9,400 AADT
- South 16th Street to Lincoln Way 10,400 AADT

As a result of traffic wear and deterioration resulting from the original use of marginal aggregates, evidenced by severe D-line cracking that required heavy maintenance, the entire Elwood Drive - South 4th Street pavement needed to be replaced. A 2.3 mi. reconstruction project produced by Public Works Director Paul Wiegand and City Engineer Jerald Byg was designed for 1993 construction with the following provisions:

- Place a 4-in. perforated subdrain with porous backfill in a 10-in. wide trench 30 in. below subgrade elevation and vertically adjacent to the new slabs.
- Rubblize the existing PCC slab in place into a crushed subbase. The maximum particle size was 4 in. and the broken material seated by multiple passes of a 10-ton vibratory roller until deflection did not exceed 1-in.



- Add a nominal 2 in. thick granular subbase of crushed limestone to the rubblized material under specified optimum proctor density requirements. The subbase extended 2 ft. beyond each pavement edge to furnish a stable track line on which the slipform paver would operate.

- Construct new 25 ft. wide by 9 in. thick directional PCC slabs to the basic original paving configuration using an Iowa C-3WR-C or C-4WR-C mix and Class 3 coarse aggregate, meeting Chart B smoothness requirements. Replacement pavement thicknesses were specified to be 10 in. for US 30 interchange ramps, 9 in. for all mainline and turning lanes, intersecting road connections and on 4th Street, and 6 in. in driveways. The South 4th Street paving was nominally 45 ft. back-to-back of curbs.

Following the letting on May 19, 1992, Manatt's, Inc. of Brooklyn, Iowa (ICPA member), was awarded a \$3,434,042.36 contract which included several staging requirements and provisions for accommodating traffic expected to be generated during the project construction period for athletic events and other major university attractions. Major quantities included:

- Rubblization	60,471 SY
- Pavement removal, full depth	19,717 SY
- Granular subbase	11,180 Tons
- 4 in. Subdrain	20,698 LF
- 9 in. PCC pavement	75,663 SY
- 6 in. PCC pavement	1,846 SY
- 10 in. PCC pavement	2,016 SY



Rubblizing was accomplished under subcontract by Concrete Recyclers, Inc. using two Guries resonant breakers. Difficulty was experienced where D-cracked joints had permitted moisture penetration into the Squaw Creek silt which had been used for embankment construction. Its spongy quality prevented fracture in some areas to the specified particle size. In certain locations, removal of oversized particles and replacement with drainable crushed limestone was required. In most locations, a heavier thickness of subbase screenings was authorized to secure a firm and



stable paving base. Complicating construction progress throughout 1993 were frequent summer rains, none more devastating than the torrential downpours on July 8 & 9, which produced a flood stage on Squaw Creek that inundated Lincoln Way, Elwood Drive, Iowa State Center buildings and Manatt's concrete plant site.



- Concrete was batched from Manatt's Con-E-Co plant located on South 16th Street near the project and transit mixed in company trucks.
- A two-track REX Town and Country paver placed all mainline concrete, including the monolithic curbs, following stringline guide stakes placed at 25 ft. intervals and with intermediate support stakes at mid-span.
- Incidental and supplemental pours for turn lanes were placed with a PavSaver machine.
- A burlap surface texture was provided. Contraction joints at 15 ft. intervals were neatly sealed with hot-pour filler.
- Riding quality when tested by profilometer was achieved within specification limits.
- Lighting and signalization requirements were performed under a subcontract by Dickinson Co., Inc.

The concept of reconstructing an existing PCC pavement by adding subgrade drainage, requiring in-place crushing

and building a new concrete arterial route under traffic was truly challenging but this design treatment offers another alternative to the universal problem of economically perpetuating inadequate or deficient municipal streets.



Superintendent Curt Manatt is proud of his company's work and believes that completion of this project will greatly enhance the attractiveness, durability and capacity of Elwood Drive to perform its intended function in the city of Ames.

"In actuality, the project probably couldn't have been accomplished in the conventional sense during 1993 because of inclement weather, but in spite of technical difficulties that required many staging sequences needed to accommodate heavy area traffic, we are confident that our structural and aesthetic design treatment has incorporated those engineering qualities we intended to provide for motorists of this city."

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