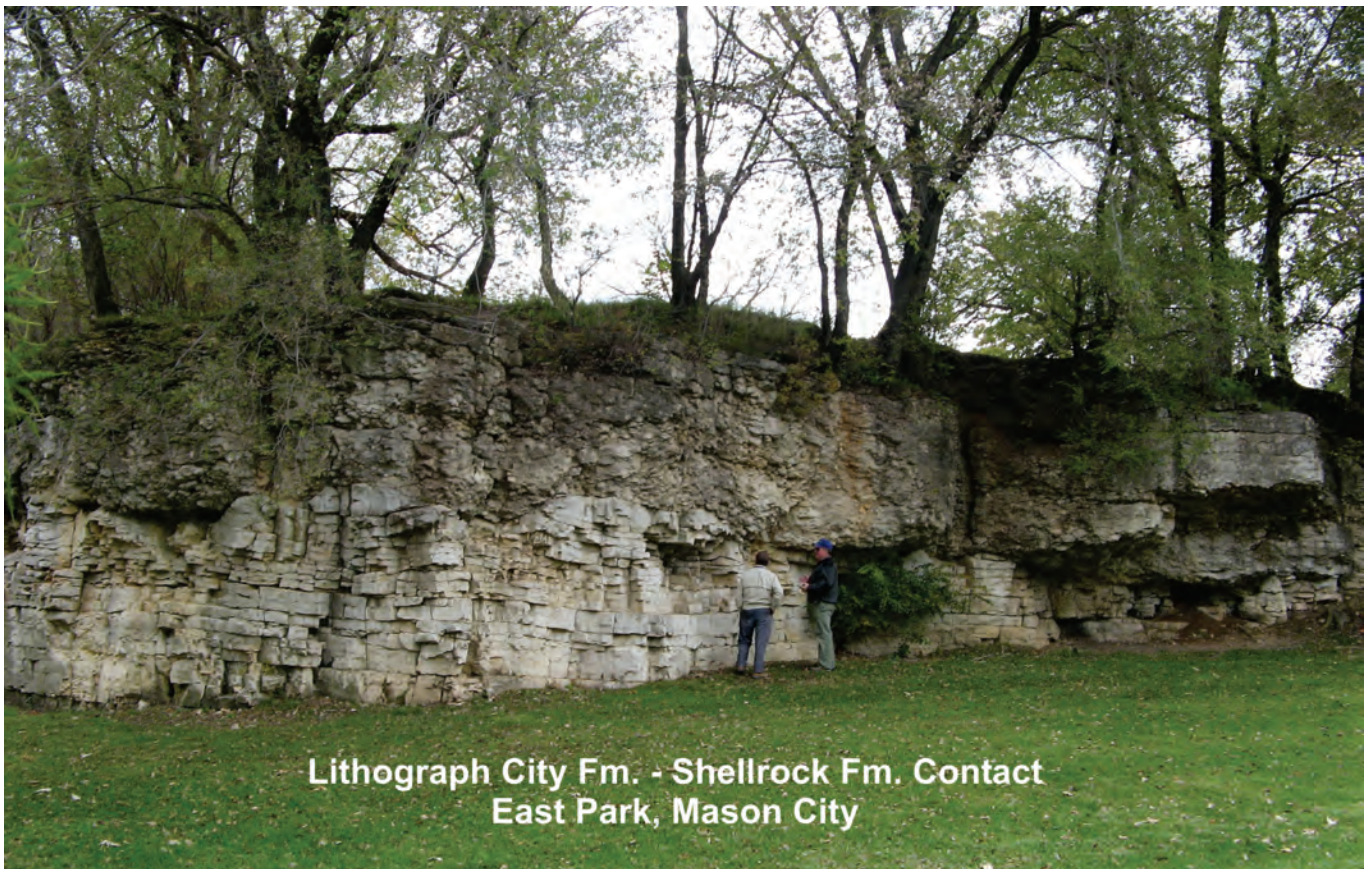


***CEDAR VALLEY GROUP:
THE LITHOGRAPH CITY – SHELLROCK
FORMATION CONTACT AT MASON CITY, IOWA***

Robert M. McKay and Huaibao Liu



Geological Society of Iowa

April 21, 2012

Guidebook 90

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TABLE OF CONTENTS

**Field Guide to the Cedar Valley Group: Lithograph City – Shellrock Formation
Contact at Mason City**

by Robert McKay and Huaibao Liu

Introduction.....1
 Figure 1 – Stratigraphic section from former Holnam Quarry.....2
 Figure 2 – Fossil and carbonate texture examples.....3
Stop 1 – East Park, Mason City4
 Figure 3 – Location of Stops 1 & 2.....4
 Figure 4 – Erosional Relief at Stop 1.....5
Stop 2 – Meredith Willson/Music Man Footbridge.....5
 Figure 5 – Meredith Willson Footbridge.....6
 Figure 6 – The Canyon at Willow Creek.....7
Stop 3 – Lime Creek Conservation Area – Nature Center Quarry and South River
 Bluff Trail Quarry.....7
 Figure 7 – Location of Stops 3 & 4.....8
 Figure 8 – Abandoned Quarry below Lime Creek Nature Center.....9
 Figure 9 – Abandoned Quarry along South River Bluff Trail.....10
Stop 4 – Lime Creek Conservation Area – Quarry Lake.....10
 Figure 10 – Lithograph City – Shellrock Fm. At Quarry Lake.....11

References.....12

INTRODUCTION

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Past Geological Society of Iowa field trips in the Mason City area were held in 1963 (Koch, Wagner and Mettler, 1963) and 1998 (Anderson and Bunker, 1998). The 1963 trip focused on rock quarry sections in the Shell Rock and overlying Lime Creek formations to the east and south of Mason City. The 1998 trip was quite varied and included Quaternary Des Moines Lobe, Devonian bedrock, and ag-environmental focused stops. The rock-focused portion of that trip included examination of Lime Creek roadcut exposures (Bird Hill, Cerro Gordo County) and Shell Rock quarry sections at the Mason City Holnam Inc. cement company quarry, as well as a tour of the cement plant. The 1984 Tri-State Geological Field Conference also visited Shellrock Formation exposures at the Mason City cement company quarries and Lime Creek Formation exposures in Floyd County (Anderson, 1984). This year's post Iowa Academy of Science meeting half-day field trip will stay in the confines of Mason City to examine exposures of the Lithograph City and Shell Rock formations of the Cedar Valley Group that have never been visited on previous GSI or Tri-State field trips.

Witzke (1998) provided a summary of the stratigraphy and paleontology of the Lithograph City and Shell Rock formations in the Mason City area. Figure 1 is taken from Witzke's summary and illustrates the thicker section exposed immediately west of Mason City in the large and expansive quarry of the former Holnam Cement Company (now Holcim Cement). That summary is still valid today and the reader is referred to that publication for a detailed explanation. Thanks to the work of previous geologists, Calvin (1897), Belanski (1927), Koch (1970), Witzke and Bunker (1984) and Witzke, Bunker, and Rogers (1988) we have a good understanding of the lithofacies, fossils and stratigraphic relations of the two formations at Mason City. Day (1988, 1996) and more recent publications have added considerable knowledge to the brachiopod and conodont biostratigraphy of both formations.

Today's field trip will focus on visiting outcrops that display the contact of the Lithograph City Formation and the overlying Shell Rock Formation. All of the outcrops being visited are on public property and the use of hammers is discouraged. The outcrops of the Shellrock Formation will all contain excellent stromatoporoids, extinct sponges, and the Lithograph City Formation will show outstanding examples of calcite filled fossil gas bubbles, or birdeye fabric. Figure 2 show examples of these fossils and carbonate textures.

Holnam Limestone Quarry
NE sec. 19, T97N, R20W, Cerro Gordo Co.

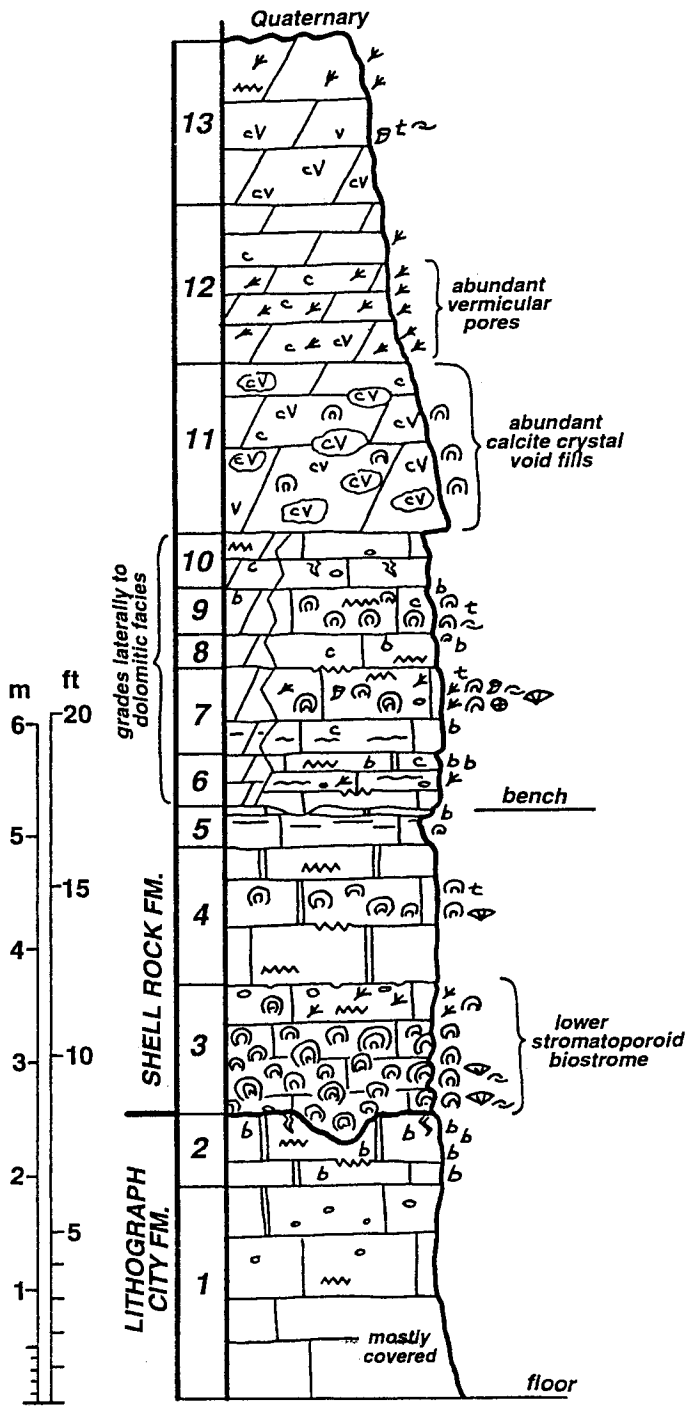


Figure 1. Graphic illustration of the stratigraphic section exposed in the former Holnam Cement Company Quarry, Mason City (from Witzke, 1998).

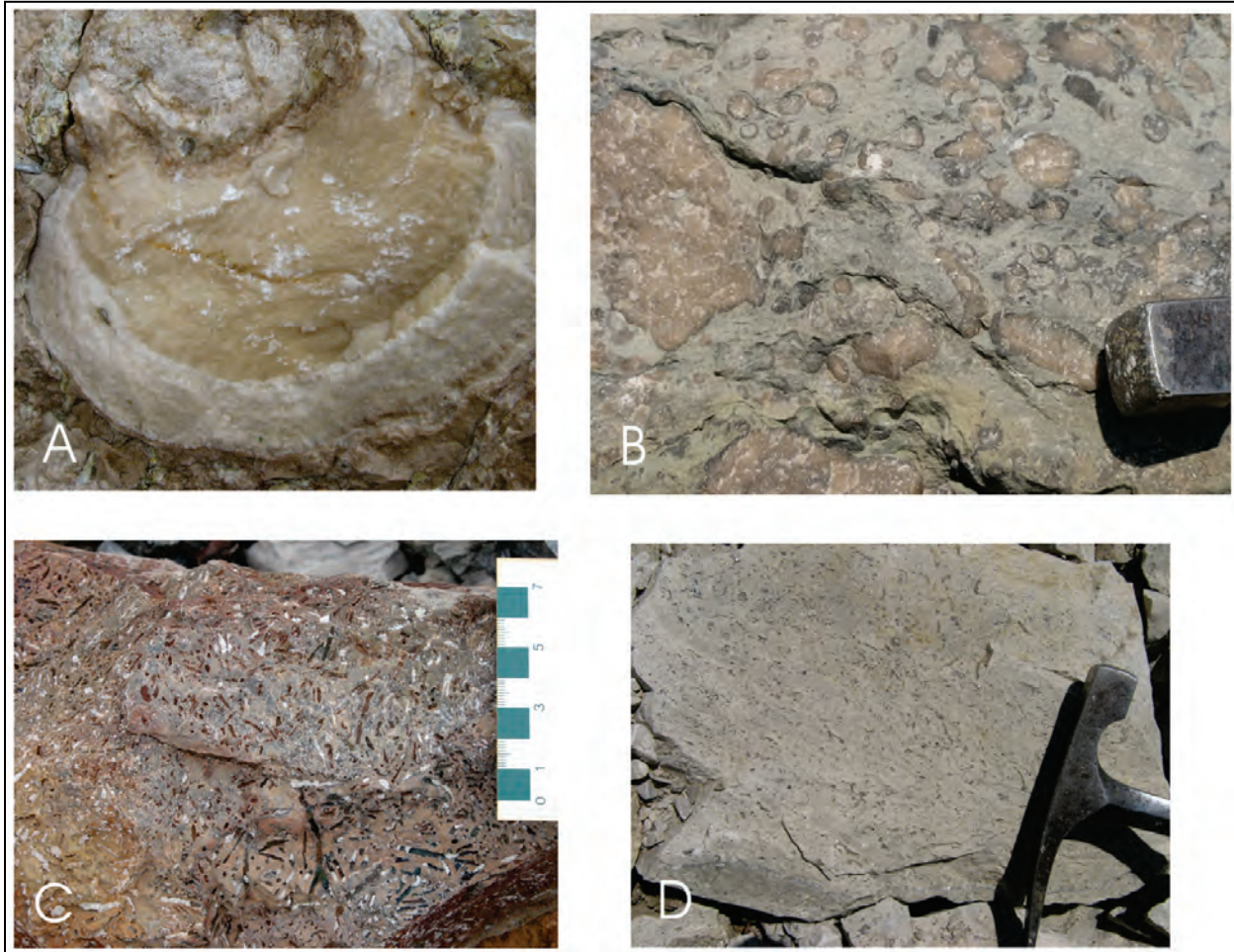


Figure 2. Stromatoporoids and birdseye fabric. A) Massive subspherical stromatoporoid. B) Irregular shaped stromatoporoids. C) Stick or twig-shaped stromatoporoids as molds. D) Calcite filled fossil gas bubbles or birdseye structure.



Figure 3. Location of Stop 1 at East Park and Stop 2 at Meredith Willson Footbridge.

Stop 1 – East Park, Mason City

The field trip will begin at the northwest corner of East Park along the Winnebago River. From downtown Mason City take U.S. 65 (Delaware Ave) north and turn east onto 4th St. NE. Travel east on 4th St. NE to North Carolina Ave and turn north. Go north one block on North Carolina Ave and turn east into the parking lot along the river and below the large rock outcrop on the grassy hillside.



Figure 4. Erosional relief along the Lithograph City – Shellrock formation contact at East Park, Stop1.

This outcrop is an outstanding example of the disconformable contact between the Lithograph City Fm. and the overlying Shell Rock Fm. Approximately two meters of each formation is exposed here and there is almost one meter of erosional relief developed along the contact. The Lithograph City Fm. is mostly limestone and is not well laminated but displays exceedingly well developed birdseye carbonate fabric typical of a carbonate mudflat facies at the top of a marine regressive cycle. Transgressive to regressive marine cycles in the Cedar Valley Group are all capped by peritidal regressive facies such as this. The basal unit of the Shell Rock depositional cycle is a distinctive stromatoporoid biostrome containing abundant subspherical stromatoporoids in a fossiliferous limestone matrix. Small stick-shaped stromatoporoids are also common throughout the biostrome. The upper part of the biostrome contains the branching colonial rugose coral *Pachyphyllum*. This same stromatoporoid biostromal facies has been recognized by Witzke (1998) in cores and other quarries at Mason City and has been correlated to the basal Mason City Member of the Shellrock Formation in its type area in western Floyd County.

Stop 2 – Meredith Willson / Music Man Footbridge

Travel to Stop 2 by turning south onto N. Carolina Ave. from the parking lot at Stop1. Go south one block to 4th St. NE. Turn west onto 4th St. NE and go west four blocks to N. Georgia Ave.. Turn south onto N. Georgia Ave and go south six blocks to 2nd St. SE. Turn east onto 2nd St. SE and drive one block to the footbridge. Park cars along the right side of 2nd St. SE and S. Connecticut Ave.



Figure 5. Meredith Willson Footbridge over Willow Creek.

The footbridge is on 2nd St. SE in Mason City over Willow Creek connecting River Heights Drive and South Connecticut Ave. Named in honor of Meredith Willson, Mason City native and internationally renowned composer, this bridge spans across Willow Creek and is featured on the Prairie School Architectural Tour / Historical Walking Tour.

Robert Meredith Willson (1902-1984) was born in Mason City, Iowa and had an immensely successful career in the music and entertainment industry as a musician, composer, conductor, arranger, author, and radio personality. While growing up in Mason City, Willson showed great musical promise. After his Mason City High School graduation he went to New York City to study and before long was professionally engaged playing with John Phillip Sousa and then with the New York Philharmonic Orchestra. After a stint in the Army, he began working in radio and television. In addition to composing, writing and appearing on television, Willson made concert appearances around the country with his wife Rini, herself a star in the concert, radio and opera business.



Meredith Willson is best remembered for his Broadway musical "The Music Man", for which he wrote the script, lyrics and music. This famous musical was a tribute to his hometown since the fictitious "River City", featured in the Broadway hit, was based on places and people in Mason City. "The Music Man" became one of the five longest running musical plays in Broadway history and won several prestigious awards. The play has been revived both on Broadway and in the movies - a Walt Disney production of "The Music Man" stars Matthew Roderick and Kristin Chen. The Beatles even capitalized on the success of the musical with their cover of "Till There Was You." Willson also wrote symphonies and many hit songs including "It's Beginning to Look A Lot Like Christmas" and "May the Good Lord Bless and Keep You". Other famous works by Willson include two other musicals, "The Unsinkable Molly Brown" and "Here's Love". Meredith Willson is honored annually at the North Iowa Band Festival while the new \$10 million attraction, The Music Man Square and Meredith Willson Boyhood Home in Mason City, stand tribute to his life and his love of music. He will be remembered throughout the world for his famous melodies, but he will live on in Mason City, Iowa as the original "Music Man of River City."

The footbridge spans Willow Creek which has cut a narrow canyon through the Lithograph City Formation on its meandering path to the Winnebago River. Along the north canyon wall small and thin patches of the lower Shellrock Fm. stromatoporoid biostrome are visible.



Figure 6. The canyon of Willow Creek has cut through the Lithograph City Fm. below the Meredith Willson Footbridge.

Stop 3 – Lime Creek Conservation Area – Nature Center Quarry and South River Bluff Trail Quarry

Travel to Stop 3 from the Willson footbridge by driving north on S. Conneticut Ave. to East State St. Turn west onto East State St. and go three blocks west to U.S. 65 (S. Delaware Ave.). Turn north onto U.S. 65 (S. Delaware Ave) and drive 1.9 miles north to Nature Center Rd. Turn right onto Nature Center Rd. and follow 0.8 miles to the gravel parking lot at the Lime Creek Nature Center.



Figure 7. Location map of Stops 3 and 4 within the Lime Creek Conservation Area.

The last two stops of the field trip will be within the Lime Creek Conservation Area, property owned and operated by the Cerro Gordo County Conservation Board (CGCCB). At Stop 3 we encourage attendees to visit the Nature Center's exhibits and information booths. The Center has a fantastic collection of mounted birds. Of special interest will be the new exhibit on Shell Rock Fm. stromatoporoids by Molly Hanson, a recent University of Northern Iowa geology graduate, who researched and assembled the exhibit last year while working as an intern for CGCCB.



Figure 8. Abandoned quarry below the Lime Creek Nature Center.

In addition to visiting the Nature Center take a stroll to the old quarry immediately below the Center to examine laminated beds of the Lithograph City Fm. capped by the basal Shellrock stromatoporoid biostrome. A thicker section of Lithograph City Fm. is available for inspection via a short walk along the river bluff trail. From the Nature Center Quarry go to the large & signed Cottonwood tree along the river trail; turn left and walk to the sign indicating the South River Bluff Trail. Follow that paved trail to an abandoned quarry along the bluffline. Examine the barren laminated dolomitic mudstones of the Lithograph City Fm. and inspect the large blocks of basal Shellrock Fm. stromatoporoid biostrome that have recently fallen from the top of the bluff.



Figure 9. An abandoned Lithograph City Fm. quarry along the South River Bluff Trail. Note the basal stromatoporoid biostrome of the overlying Shellrock Fm. in the upper meter of the section.

Stop 4 – Lime Creek Conservation Area – Quarry Lake

To reach Stop 4 drive west on Nature Center Rd. towards the point where the road turns to the south. At this point there is a gate into the Quarry Lake area. Park vehicles along the right side of the road without blocking the gate to the Quarry Lake trail. The best exposure at this stop is a 0.5 mile walk north from the road to the northern part of Quarry Lake.



Figure 10. Paul Liu examining the Lithograph City – Shellrock Fm. contact at Quarry Lake, Lime Creek Conservation Area.

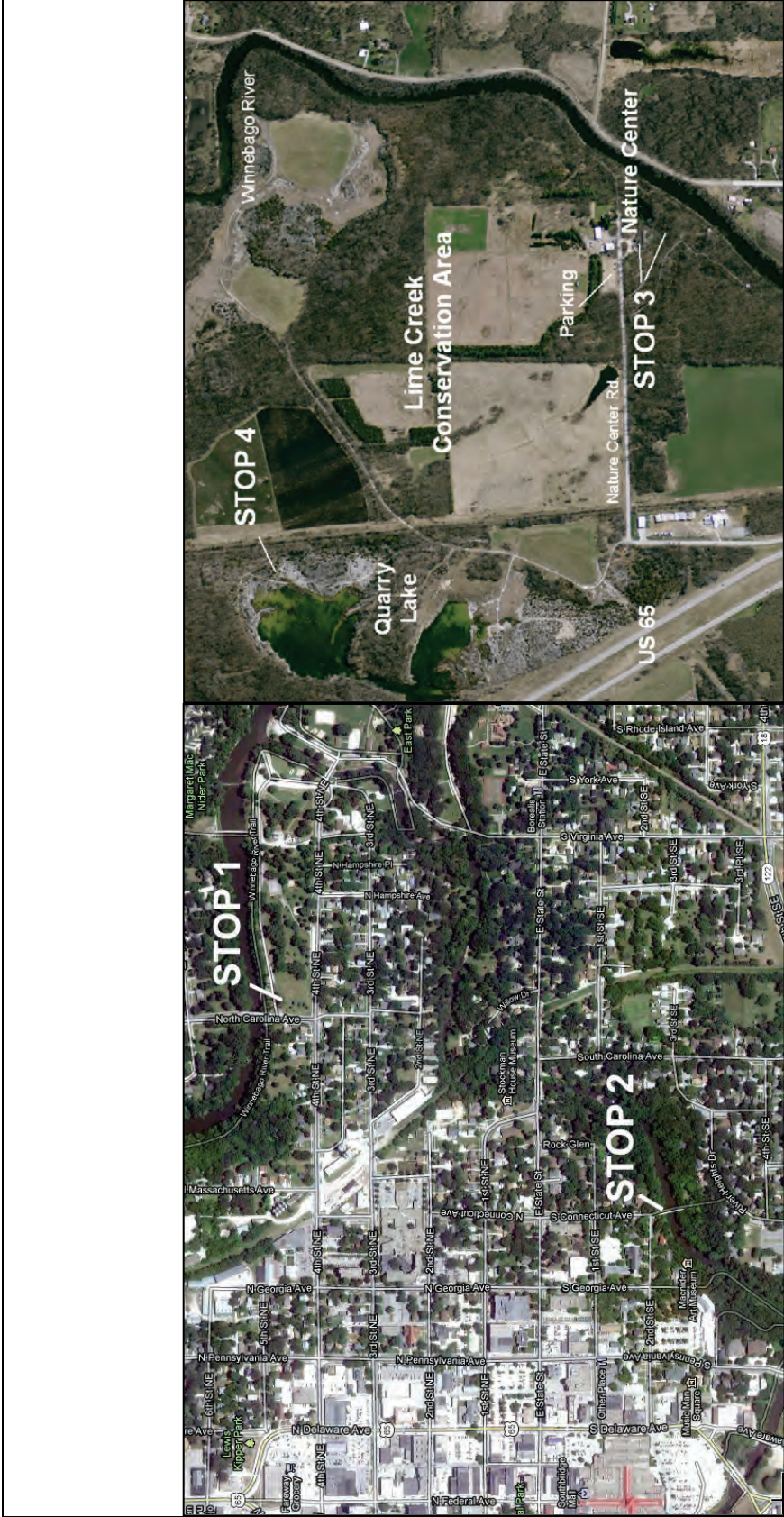
The 440 acre Lime Creek Conservation Area was donated to the county by both Lehigh and Northwestern States Portland Cement companies in the mid 1970s. Active development of the property occurred in the late 1970s and the Nature Center opened in 1984. Lehigh Cement Company operated the former quarry at the Quarry Lake area. The trail to the north end of the Quarry Lake area crosses large bedding plane exposures of Lithograph City Fm. Stromatoporoid collecting is allowed on the dump piles along the trail. At the north end of the trail is a fine outcrop of (again) the Lithograph City – Shellrock formation contact. Examine the contact to observe the dramatic facies difference above and below this important formational contact, a regressive mudflat facies with erosional relief capped by an open-marine stromatoporoid biostrome facies of the next marine transgression.

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Map showing locations of Stop 1 (East Park), Stop 2 (Meredith Willson Footbridge) and Stops 3 and 4 (Lime Creek Conservation Area)