

An aerial photograph of a residential neighborhood. The image shows a dense cluster of houses with various roof colors, interspersed with green trees. A winding stream flows through the area. In the upper right, there is a large, light-colored building, likely a school, with two prominent white circular structures. The overall scene is a typical suburban setting.

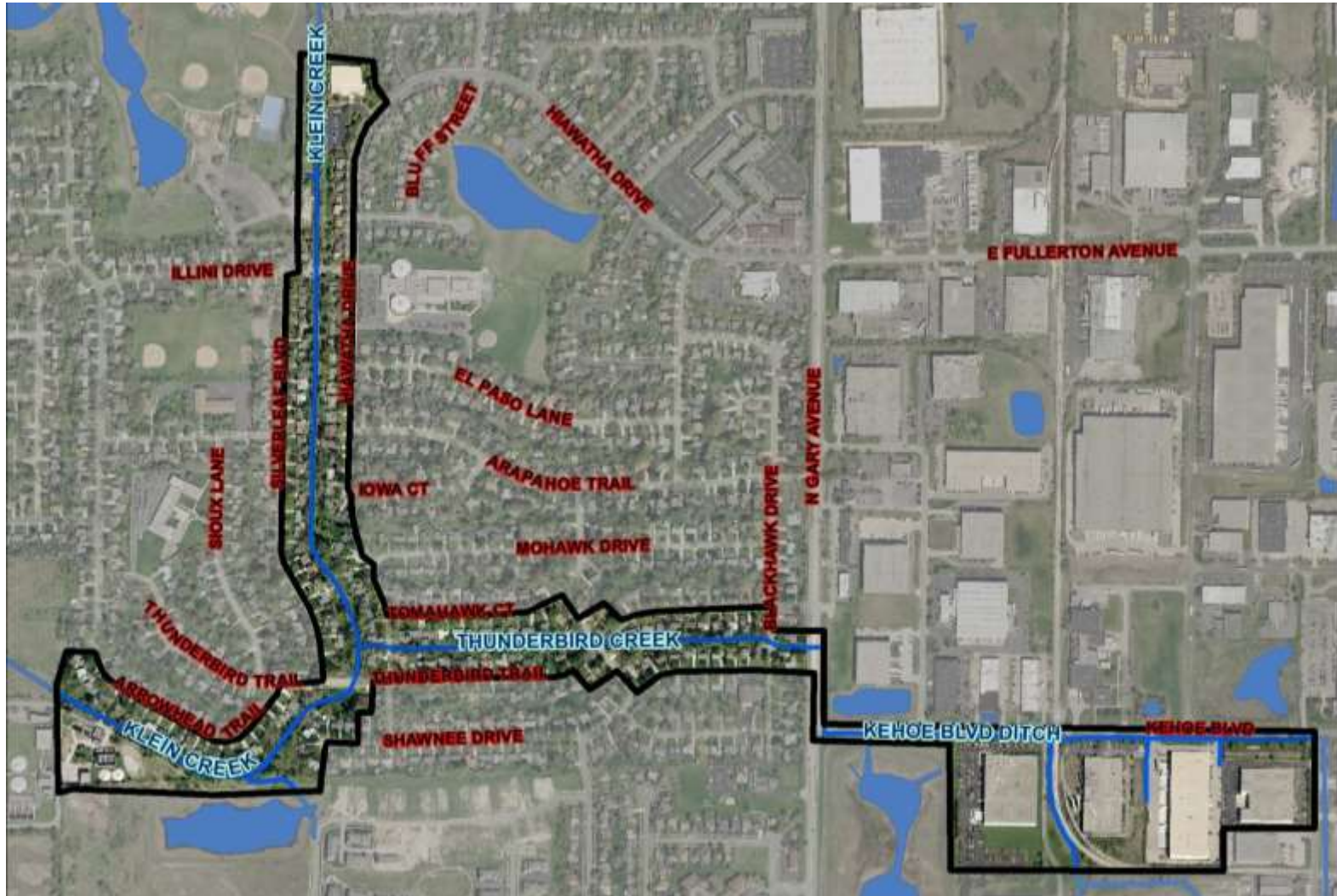
Village of Carol Stream Streambank Stabilization

Erin Pande, CFM, PWS
Drew Kustus, CFM, PE
ENGINEERING RESOURCES ASSOCIATES, INC.



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RESOURCE ASSOCIATES

Klein Creek, Thunderbird Creek, & Kehoe Blvd Ditch





Klein Creek Shoreline Erosion



Causes Include:

- Steep slopes, greater than 4:1
- Shallow root system turf grass and non-native/ weedy vegetation.
- Ice shear
- Unprotected storm sewer outlets

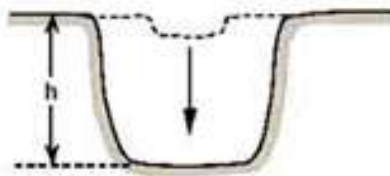


Klein Creek Shoreline Erosion



Klein Creek Stabilization

Stage I
Stable channel
Initial incision
 $h < h_{crit}$



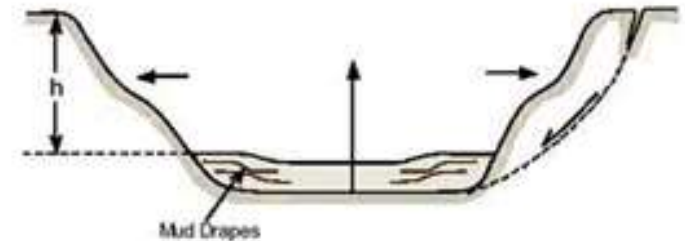
Stage II
Bed degrading
Banks stable
 $h > h_{crit}$



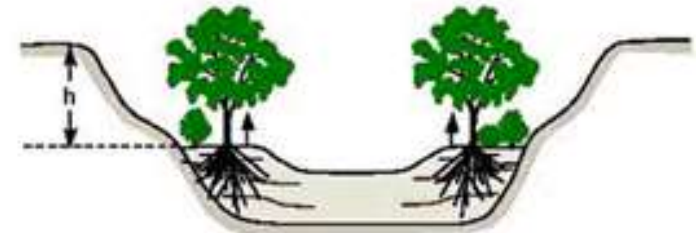
Stage III
Bed aggrading
Banks unstable
 $h > h_{crit}$



Stage IV
Bed aggrading
Banks unstable
 $h = h_{crit}$



Stage V
Slow aggradation
Banks stable
 $h < h_{crit}$





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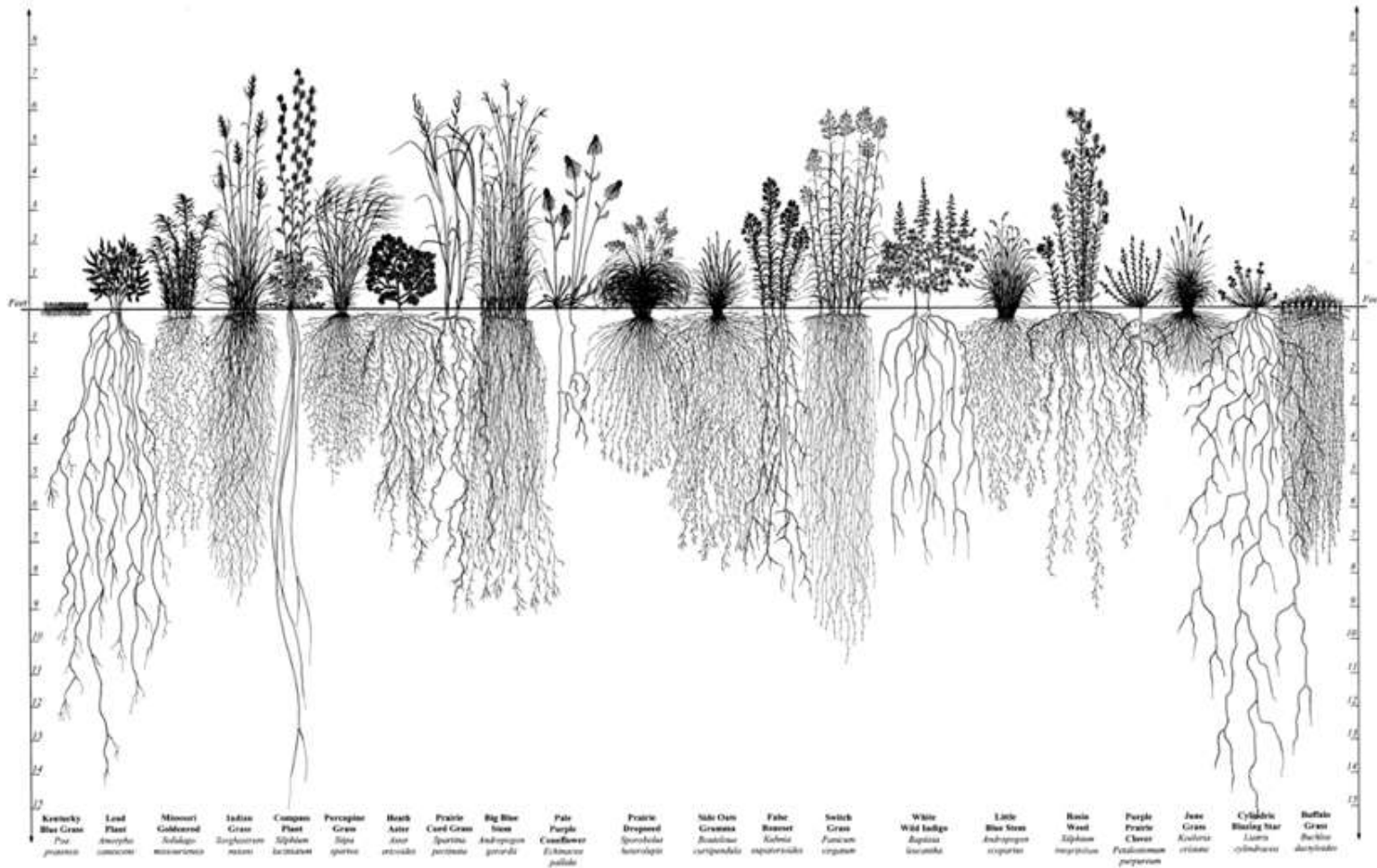
Klein Creek Stabilization





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Klein Creek Stabilization

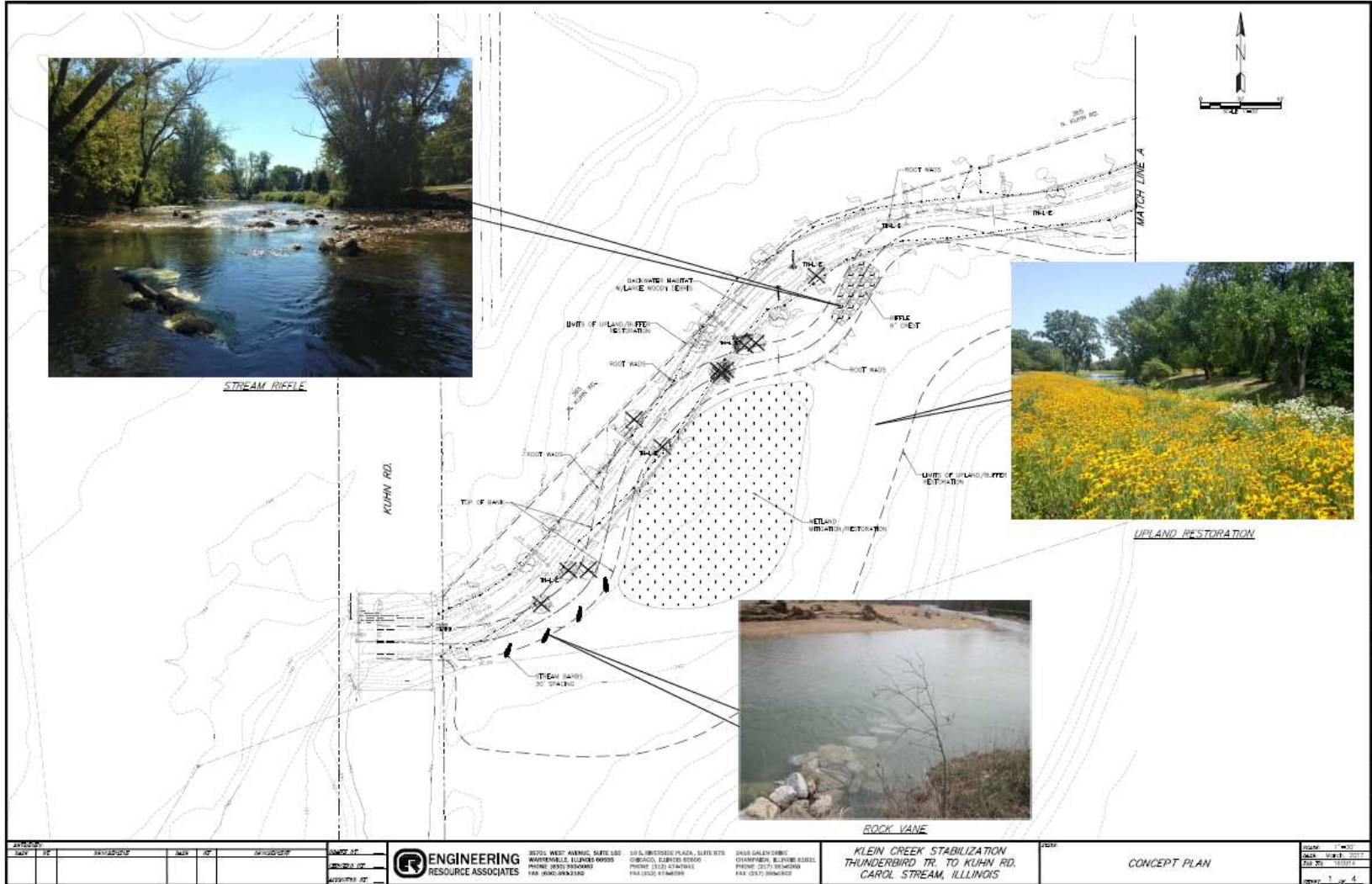


Root Systems of Prairie Plants



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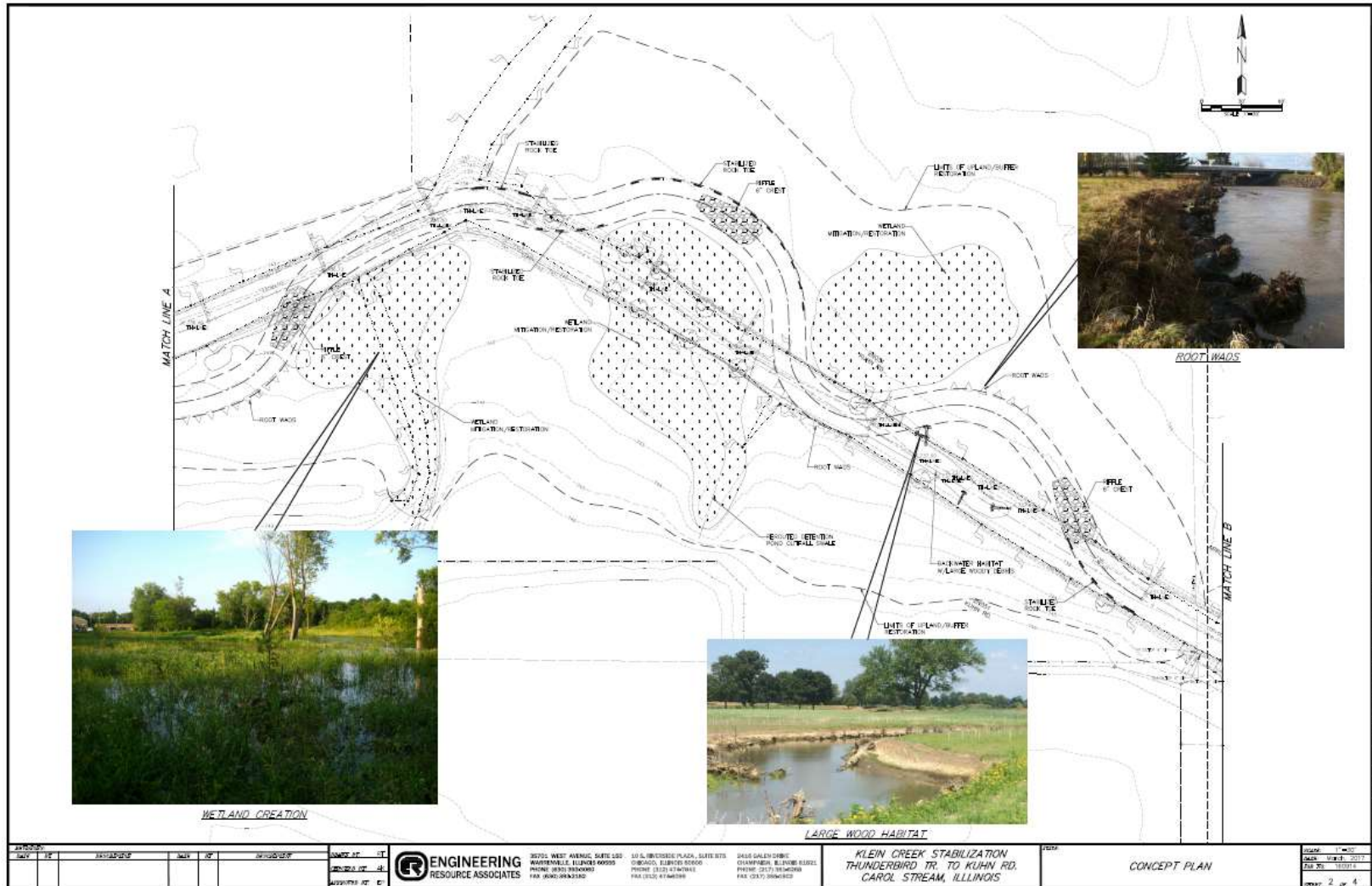
Klein Creek Stabilization





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Klein Creek Stabilization

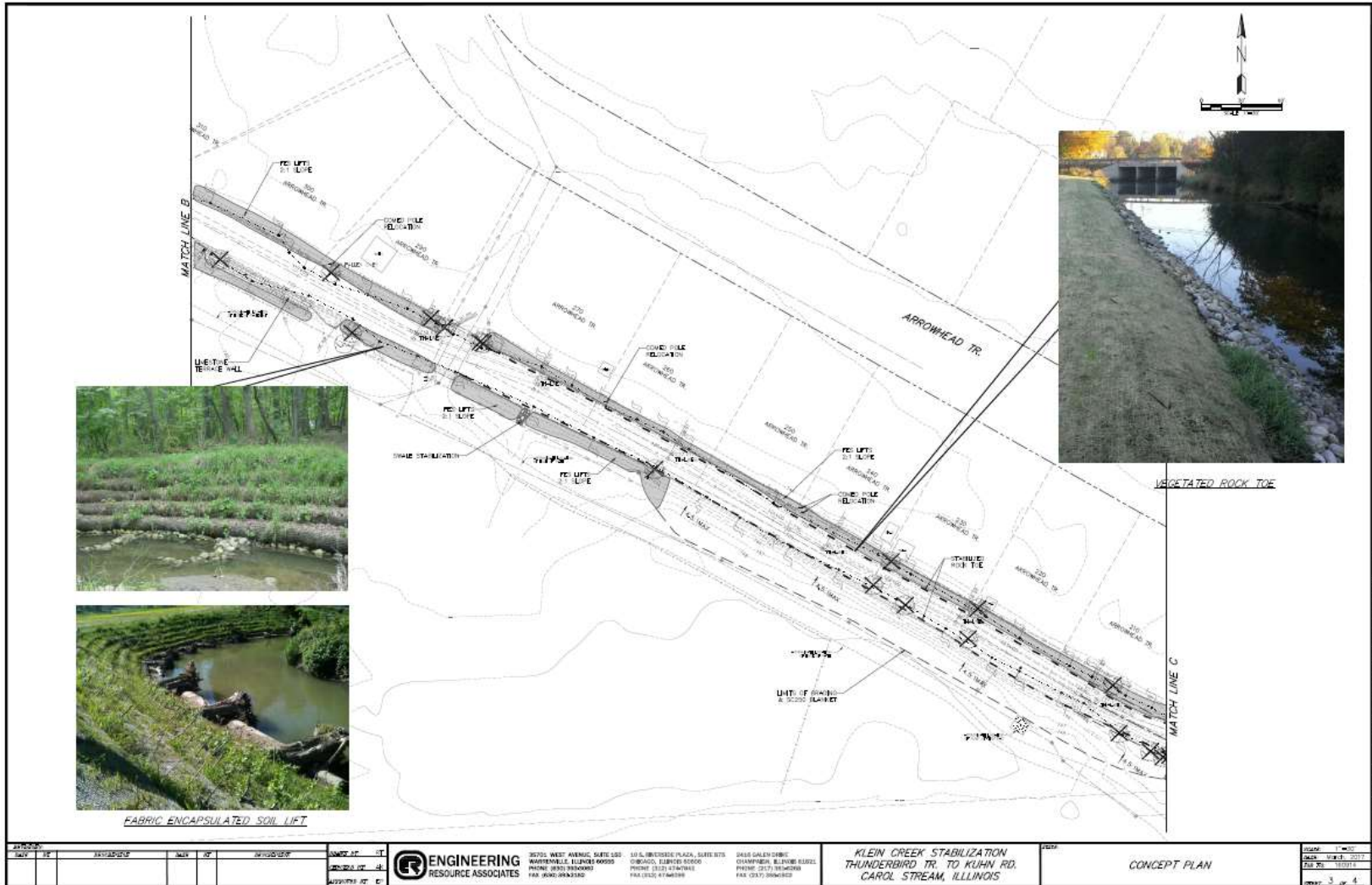


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|--|----|----------|--|----|----------|--|----|----------|---|---------------------|----------|---|--|
| DATE | BY | REVISION | DATE | BY | REVISION | DATE | BY | REVISION | DATE | BY | REVISION | | |
| | | | | | | | | | | | | | |
| ENGINEERING RESOURCE ASSOCIATES 3075 WEST AVENUE, SUITE 100 BAYVIEWVILLE, FLORIDA 32085 PHONE (904) 284-0883 FAX (904) 284-2142 | | | 10 S. WATKINS PLACE, SUITE 205 OREGON, OREGON 97003 PHONE (503) 474-7444 FAX (503) 474-7499 | | | 2425 GALEN DRIVE CLAYTON, MISSISSIPPI 38724 PHONE (662) 845-0088 FAX (662) 845-0088 | | | KLEIN CREEK STABILIZATION THUNDERBIRD TR. TO KUHN RD. CAROL STREAM, ILLINOIS | | | SCALE: 1" = 40' DATE: 10/14/17 DRAWN BY: JESSIE L. CHECKED BY: JESSIE L. | |
| PROJECT | | | | | | | | | | CONCEPT PLAN | | | |
| SHEET NO. 2 OF 4 | | | | | | | | | | 2 OF 4 | | | |



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Klein Creek Stabilization

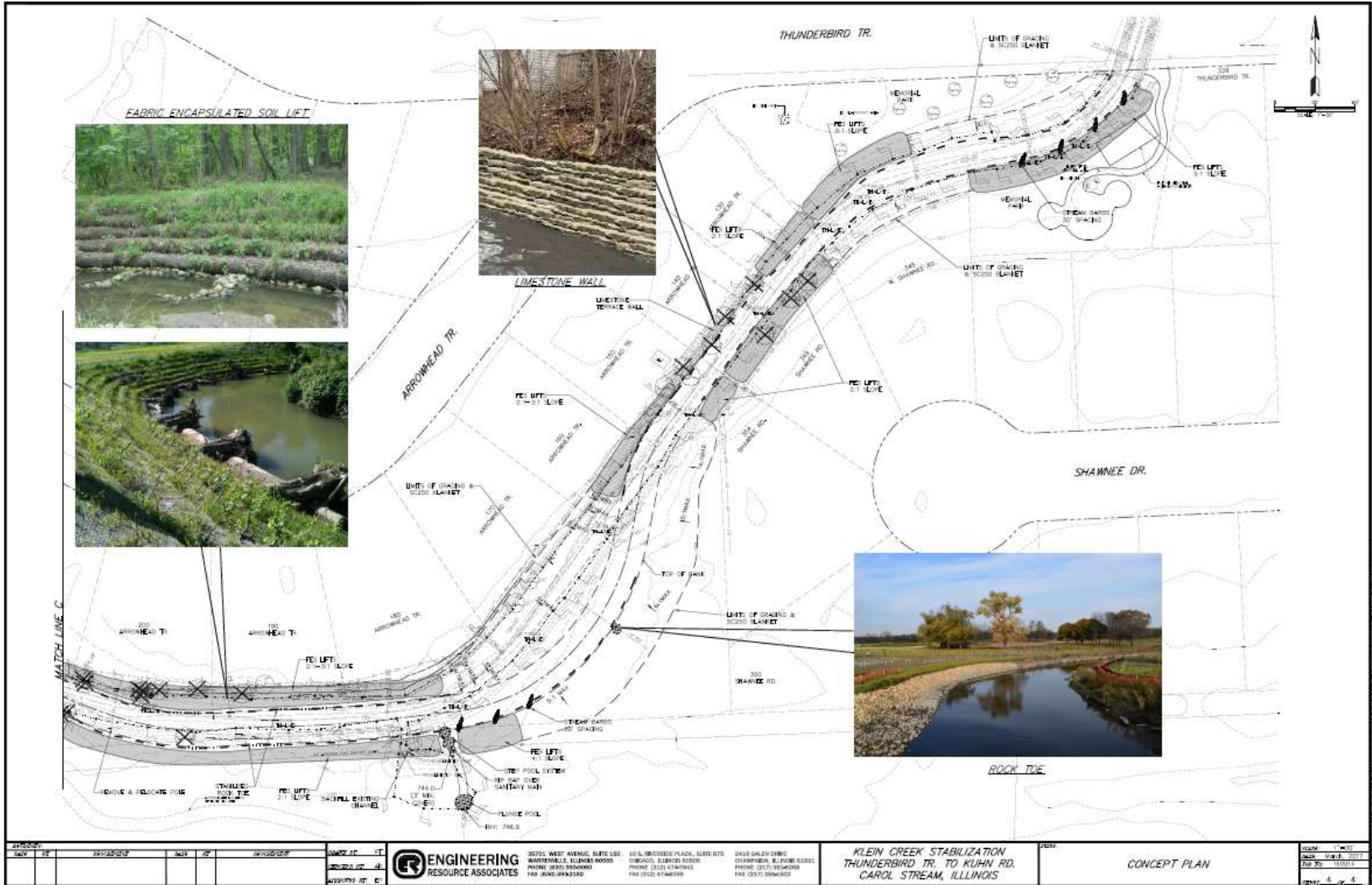


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|--|--|---|---|--|---|--------------------------------------|--|
| | | 3070 WEST AVENUE, SUITE 500 NAPERVILLE, ILLINOIS 60563 PHONE: (630) 730-0000 FAX: (630) 730-0002 | 50 N. WINDSOR PLACE, SUITE 205 CHICAGO, ILLINOIS 60606 PHONE: (312) 474-0000 FACSIMILE: (312) 474-0002 | 3400 GALEN DRIVE OAKBROOK, ILLINOIS 60451 PHONE: (312) 345-0000 FAX: (312) 345-0002 | KLEIN CREEK STABILIZATION THUNDERBIRD TR. TO KUHN RD. CAROL STREAM, ILLINOIS | SHEET CONCEPT PLAN OF 4 | DATE: 11-20-17 DRAWN: M. J. JONES CHECKED: J. J. JONES DATE: 11-20-17 |
|--|--|---|---|--|---|--------------------------------------|--|



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Klein Creek Stabilization



| NO. | DESCRIPTION | DATE | BY | APP'D | REVISION |
|-----|-------------|------|----|-------|----------|
| | | | | | |
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ENGINEERING RESOURCE ASSOCIATES

3070 WEST AURORA, SUITE 100
WARRENVILLE, ILLINOIS 60090
PHONE: (708) 261-9900 FAX: (708) 261-2342

1018 OLDFATHERS PLACE, SUITE 200
CHICAGO, ILLINOIS 60640
PHONE: (312) 274-7100 FAX: (312) 274-0880

8440 GALEN DRIVE
OLMSTED, ILLINOIS 60453
PHONE: (312) 575-8000 FAX: (312) 575-8100

KLEIN CREEK STABILIZATION
THUNDERBIRD TR. TO KUHN RD.
CAROL STREAM, ILLINOIS

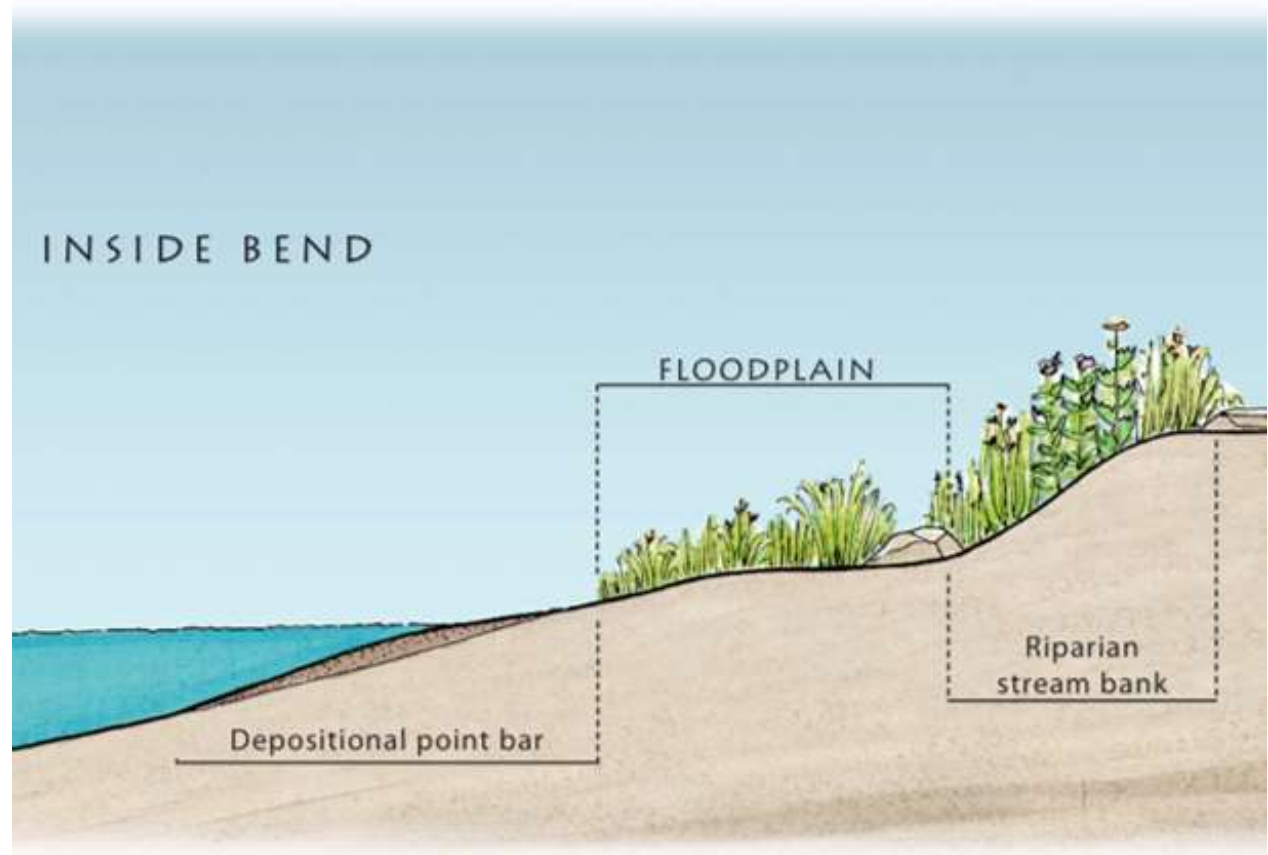
| | |
|---------------------------|----------------------|
| DATE: 04/04/2017 | SCALE: 1"=20' |
| DRAWN BY: MCM | SHEET NO: 1001/1 |
| CHECKED BY: MCM | PROJECT: 17-001 |
| SCALE: 4' = 1" (SEE PLAN) | DRAWING NO: 17-001-C |



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Regrading & Native Planting

- Regrade slopes to 4H:1V (maximum)
- Plant native grasses/flowers and native shrubs
- Stabilize with erosion control fabric





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Regrading & Native Planting

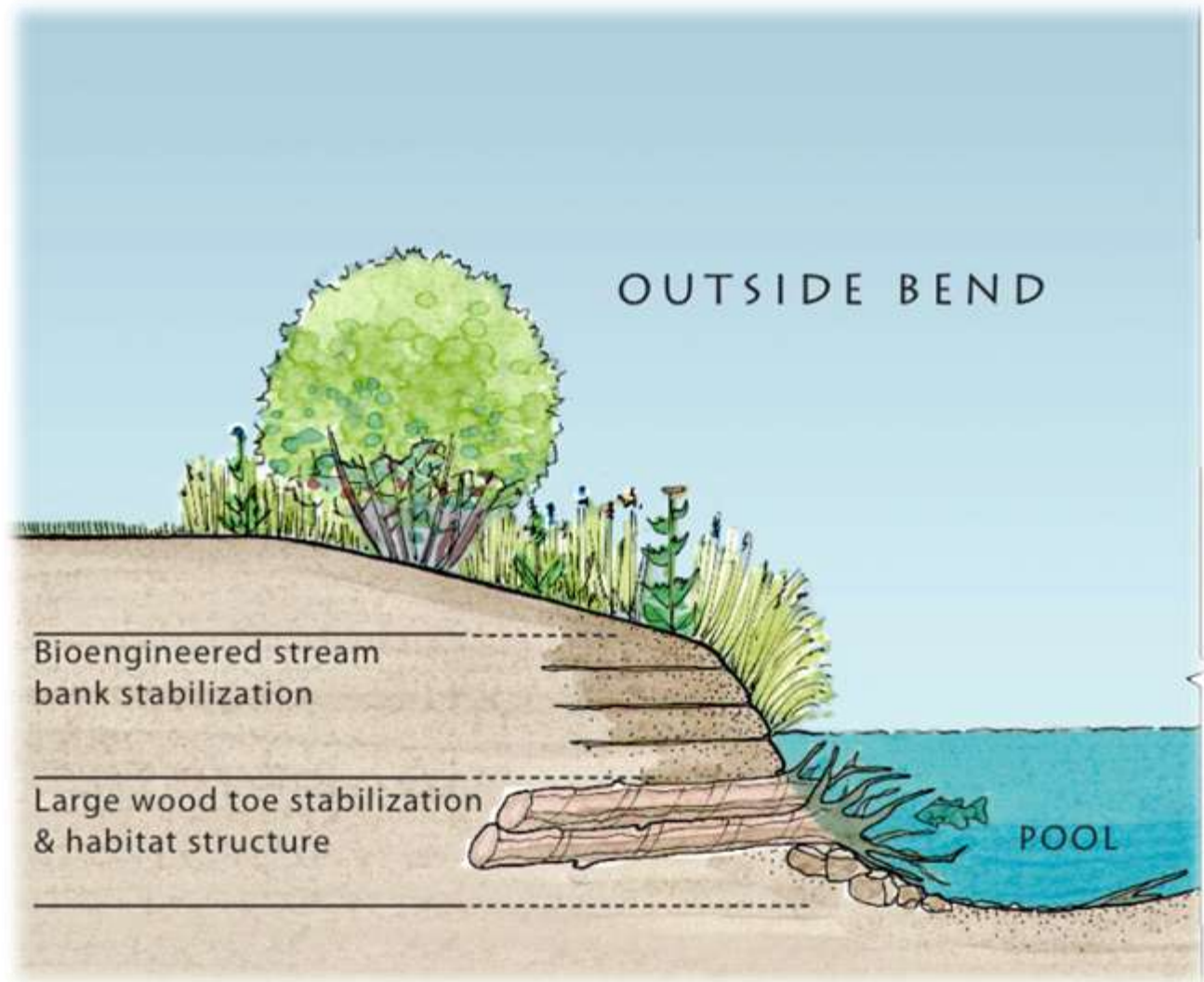




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Fabric Encapsulated Soil Lifts with Rock Toe

- 4'-7' tall coir fiber fabric wrapped around engineered soil on top of rock toe or toe wood
- Vegetated rock toe at water level
- Native herbaceous plants/grasses





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Fabric Encapsulated Soil Lifts





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Fabric Encapsulated Soil Lifts





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Root Wads

- Directs river flows away from shoreline
- Placed upstream of eroding/critical areas
- Reuse trees removed elsewhere in the project



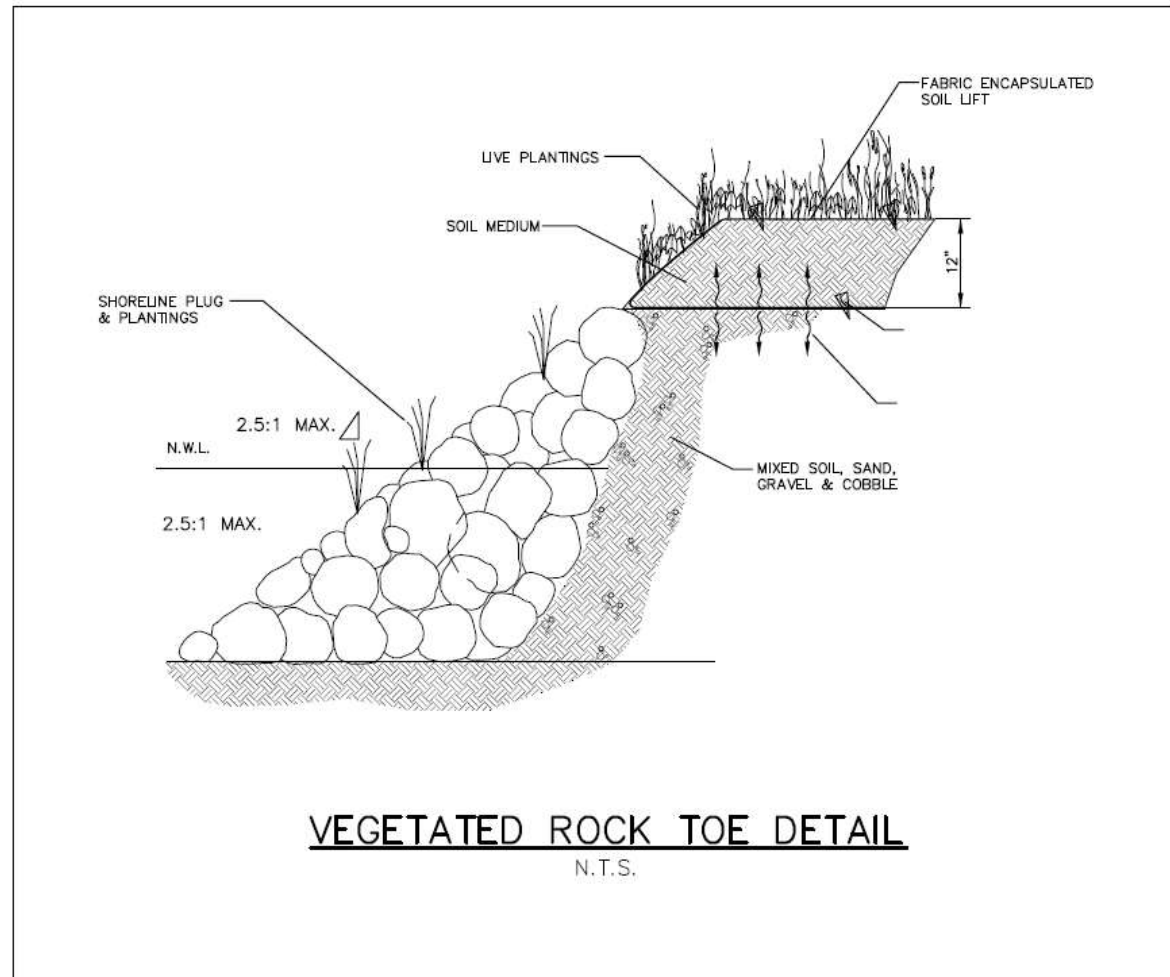


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Root Wads



- Directs river flows away from shoreline
- Placed upstream of eroding/critical areas
- Use bank-run cobble for a “natural” look
- Plant emergent plugs between cobbles





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Vegetated Rock Toe



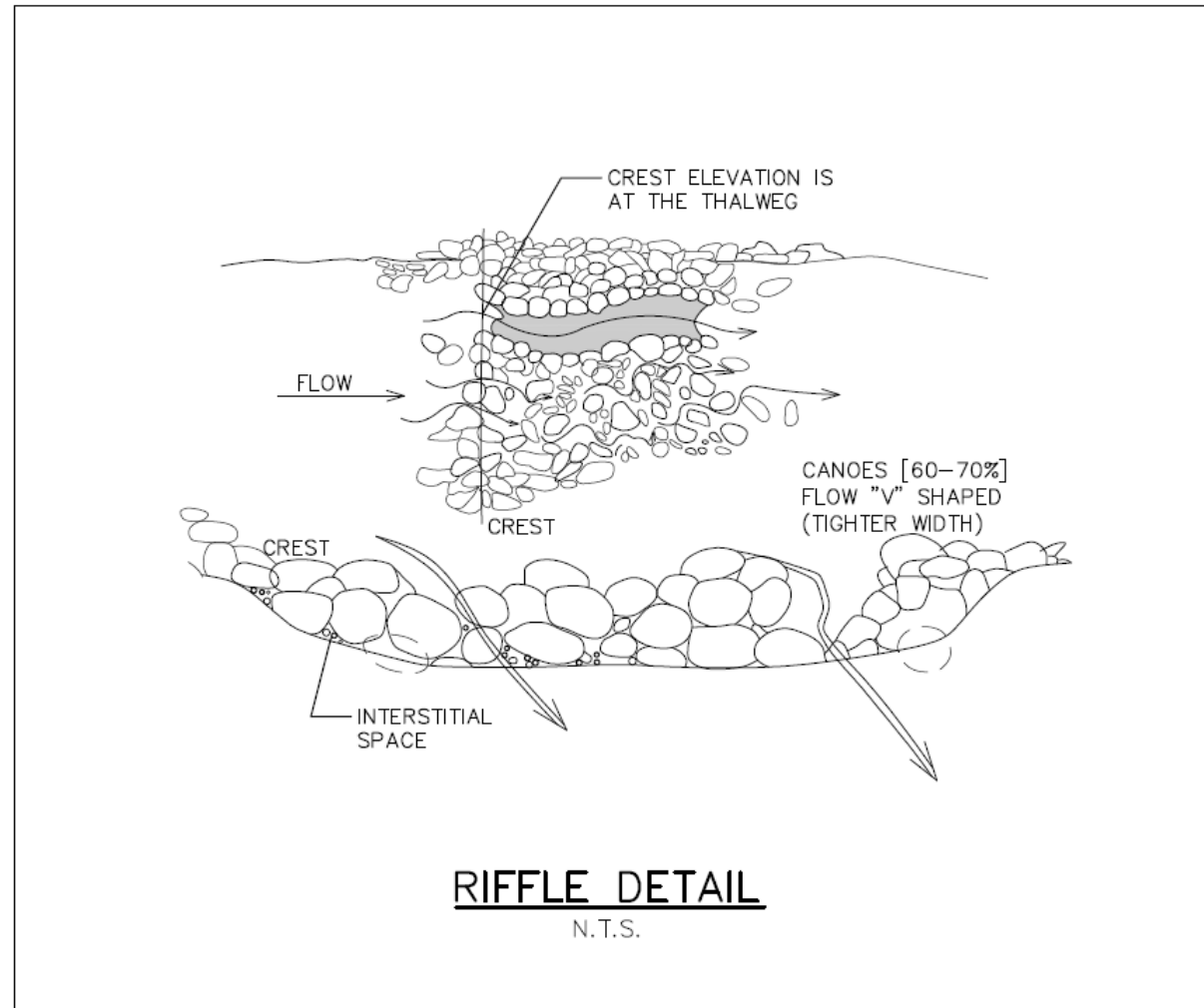


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Vegetated Rock Toe



- Forces water to flow shallow and fast
- Oxygenates water
- Good habitat for certain macroinvertebrates
- Installed in straight sections between curves of the river





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Stream Riffle





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Stream Riffle



- Provides stormwater storage and water quality treatment
- Provides long-term soil stabilization
- Restores native plant communities
- Provides habitat and food for wildlife





Upland/Prairie Restoration

- Provides stormwater storage and water quality treatment before runoff enters wetland areas
- Provides long-term soil stabilization
- Restores native plant communities
- Provides habitat and food for wildlife

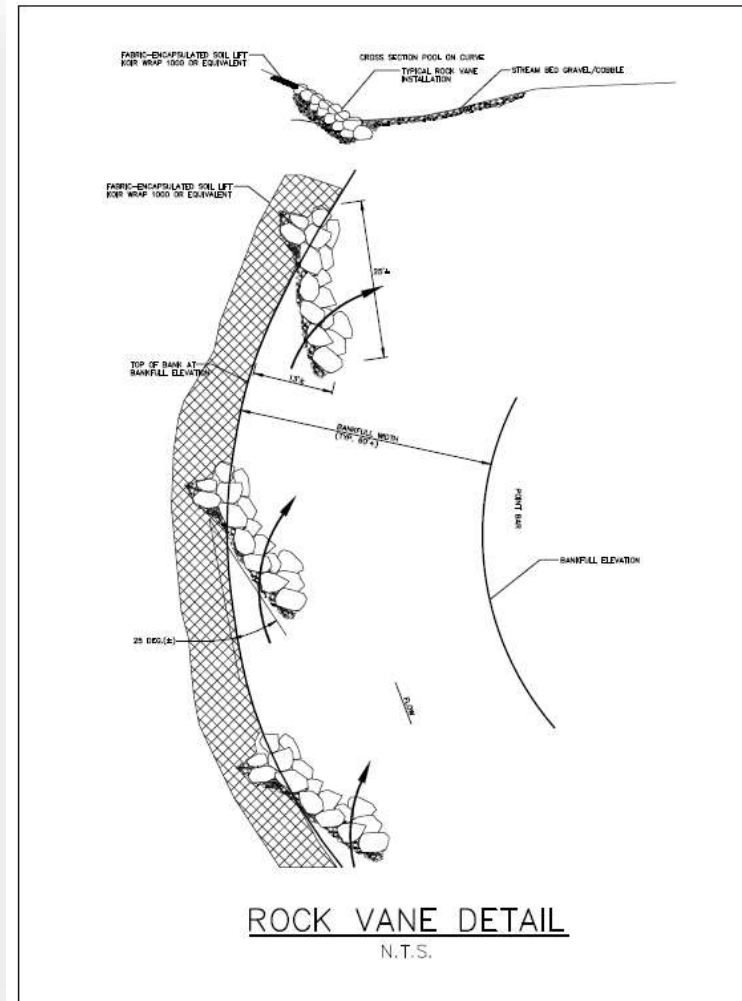




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Rock Vanes

- Directs river flows away from shoreline
- Placed upstream of eroding/critical areas





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Rock Vanes

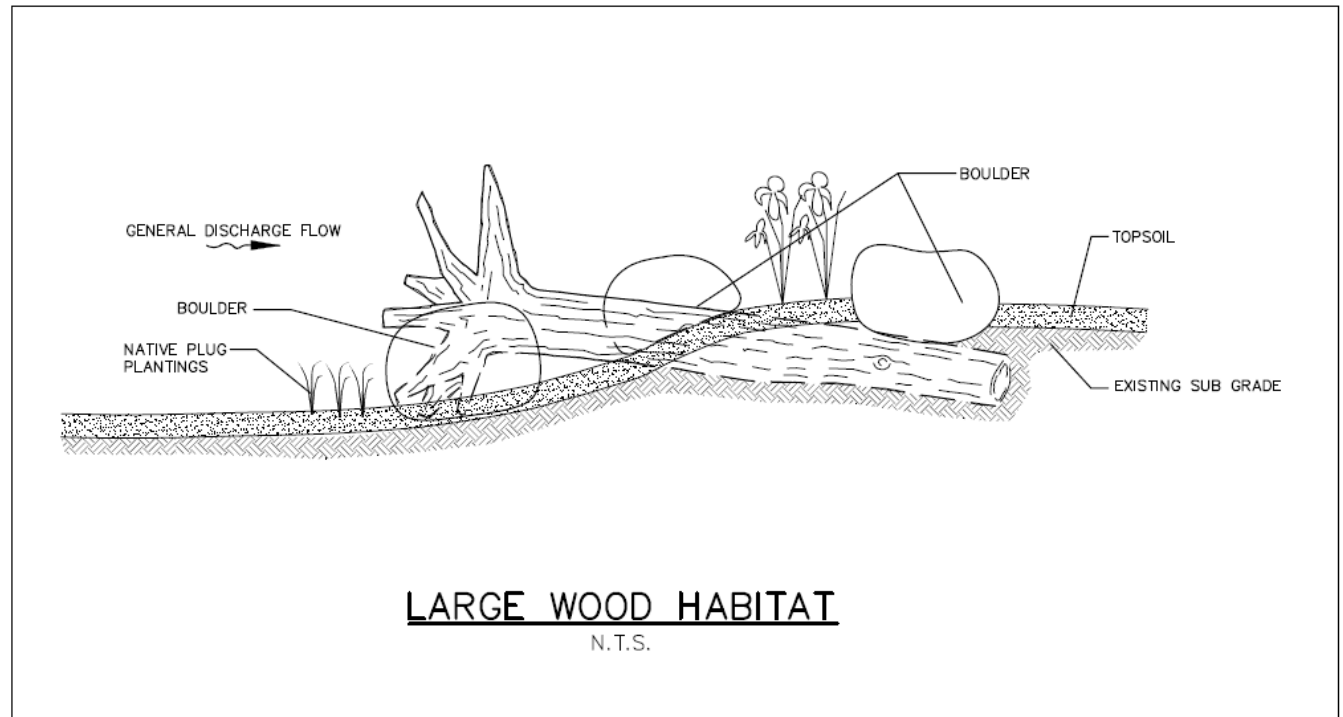




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Large Wood Habitat

- Provides cover for young fish from strong stream flows
- Reuse trees removed elsewhere on the site





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Large Wood Habitat

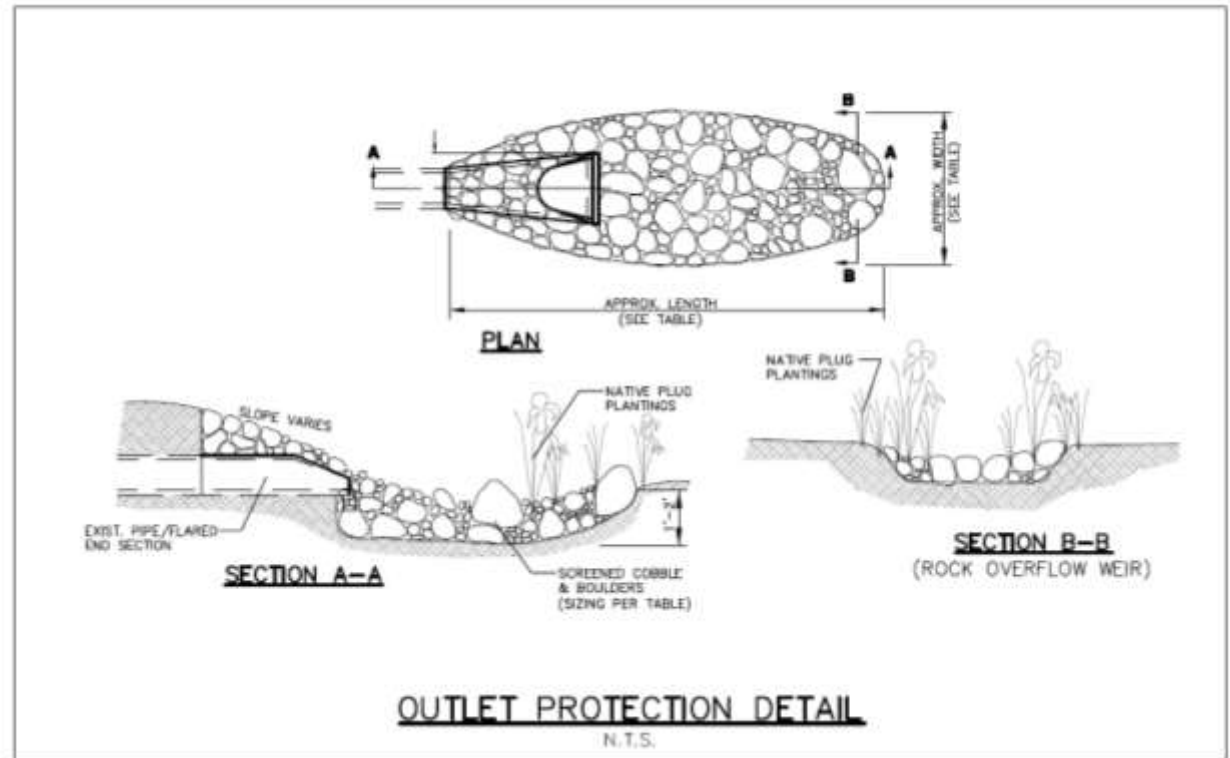




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Rock Outlet Protection

- Provides erosion protection for high velocities at outlets
- Natural look with rounded rock and native plugs





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Rock Outlet Protection

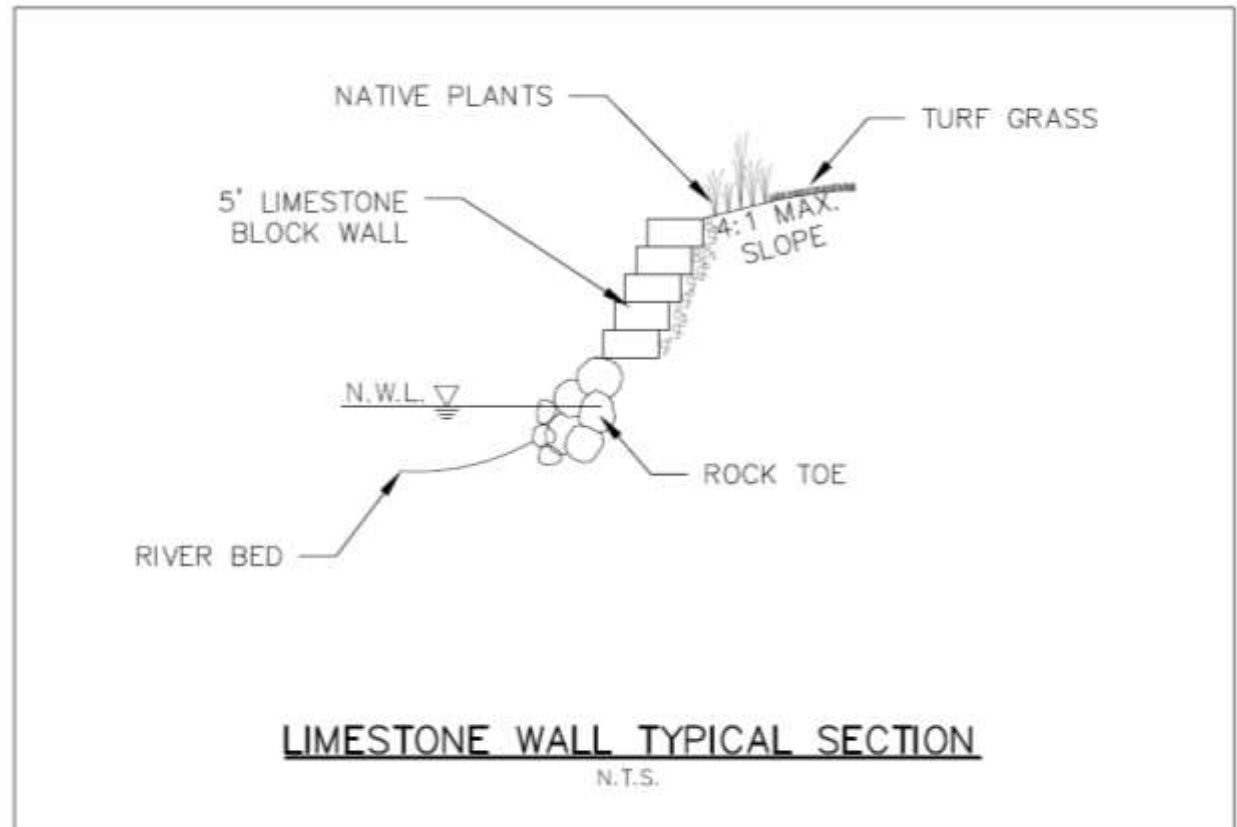




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Limestone Wall with Rock Toe

- 3'-6' limestone block wall
- Vegetated rock toe at water level
- Native herbaceous plants/grasses on terraces





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Limestone Wall with Rock Toe





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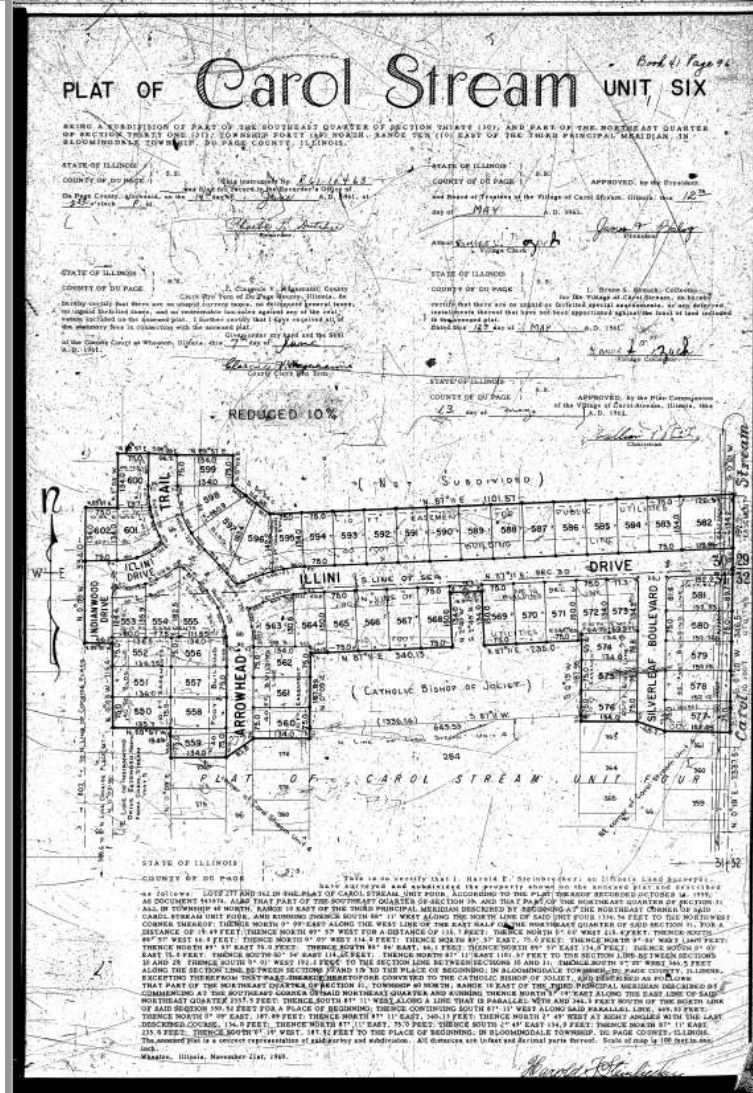
Limestone Wall





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Easements

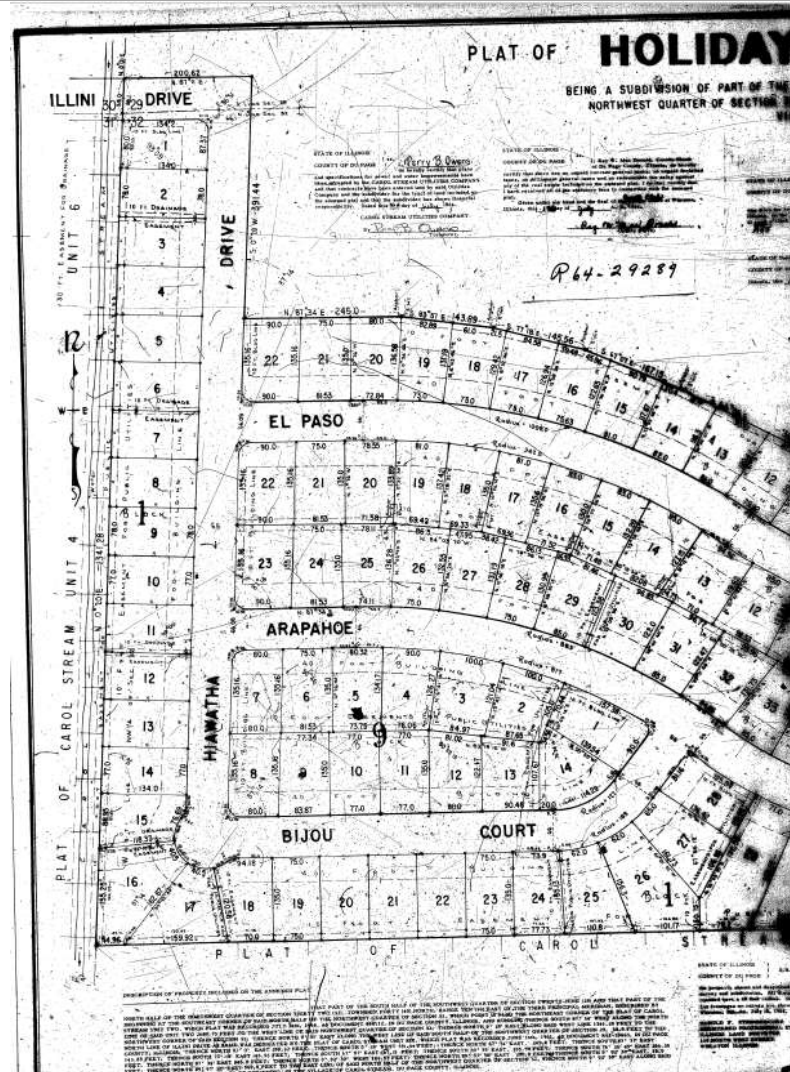






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Easements





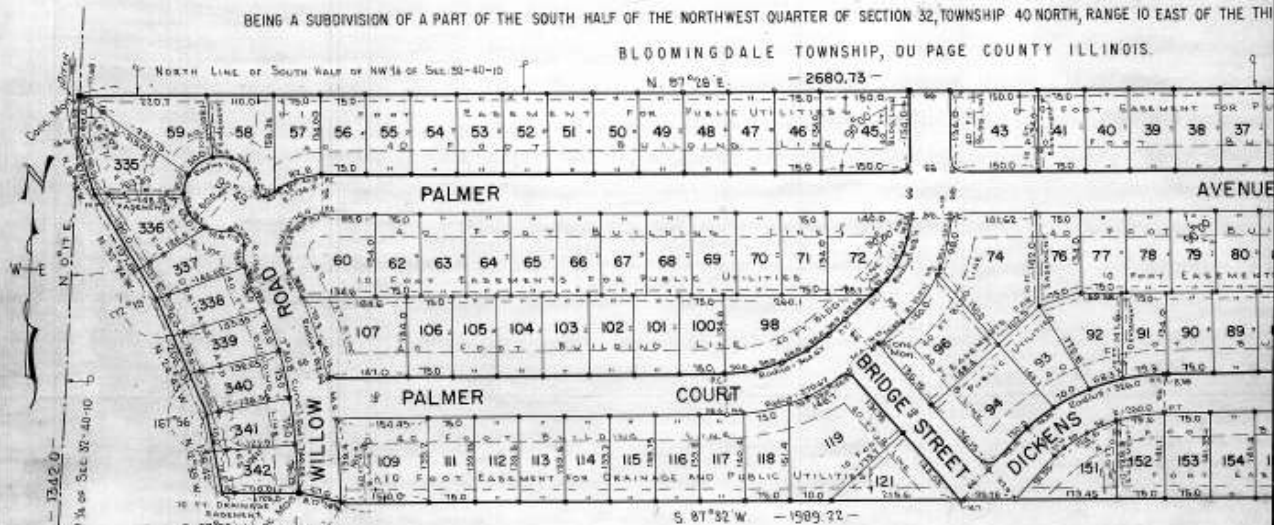
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Easements

Notes: There are no lots on this plat numbered 8 through 24, 26, 28, 30, 32, 42, 44, 61, 75, 95, 97, 99, 108, 110, 120, 122 through 150, 159 through 334.

PLAT OF Carol Stream UNIT

BEING A SUBDIVISION OF A PART OF THE SOUTH HALF OF THE NORTHWEST QUARTER OF SECTION 32, TOWNSHIP 40 NORTH, RANGE 10 EAST OF THE THIRD MERIDIAN,
BLOOMINGDALE TOWNSHIP, DU PAGE COUNTY ILLINOIS.



3132

STATE OF ILLINOIS } S.E.
COUNTY OF DU PAGE } This plat was
No. 888112
County approved, on the 24th day of JULY
A.D. 1954, at 2:20 o'clock P.M.
Sauvance-Hartley
Recorder

STATE OF ILLINOIS } S.E.
COUNTY OF DU PAGE } APPROVED, by the
Based on Reporters of Du Page County, Illinois, this
day of July, 1954, at 10:00 A.M., by the Board of
County Commissioners.
[Signature]
County Clerk

STATE OF ILLINOIS } S.E.
COUNTY OF DU PAGE } APPROVED, by the
Du Page County Board of Public Works, this 14th
day of July, 1954, at 1:00 P.M.
[Signature]
Chairman

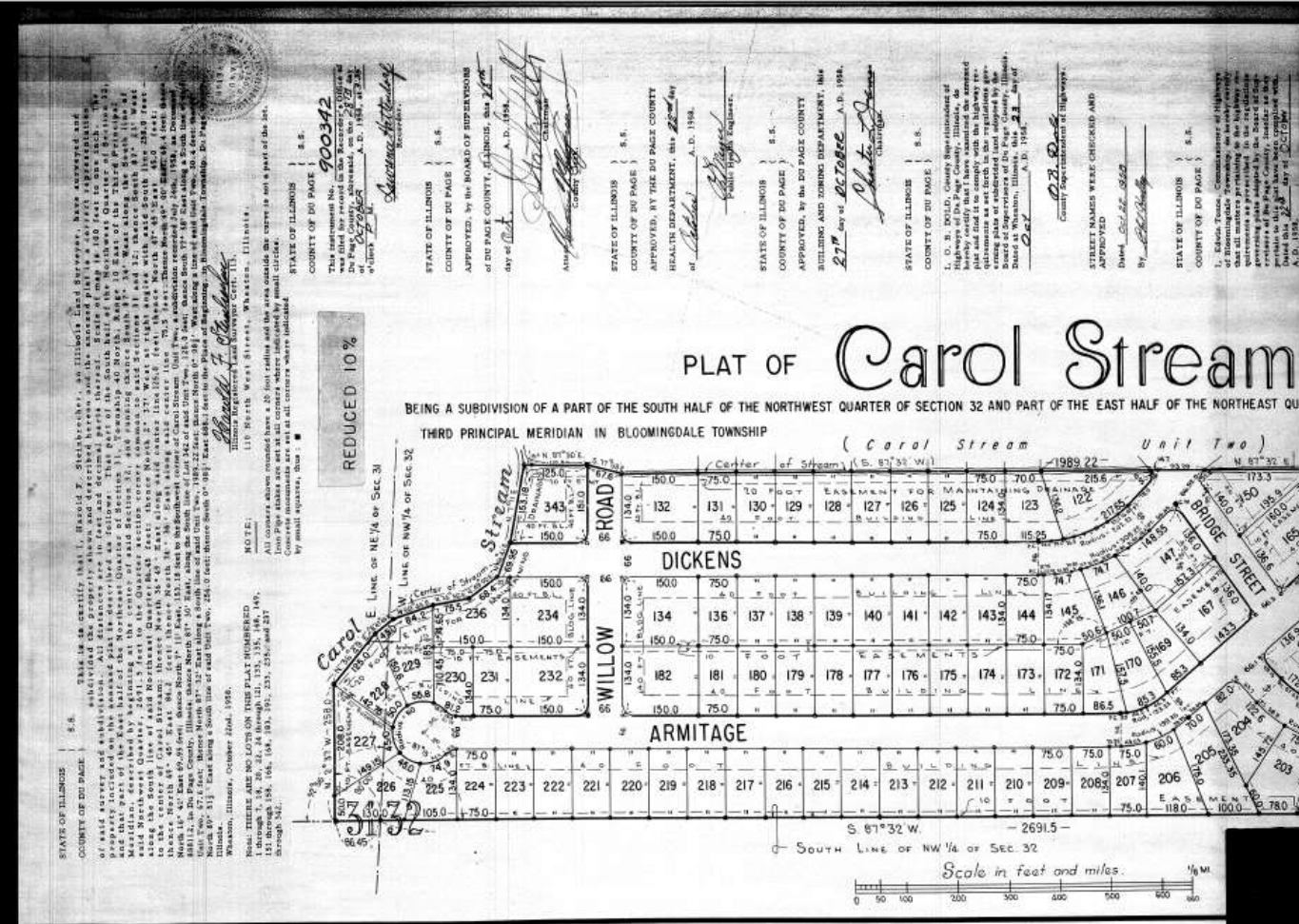
STATE OF ILLINOIS } S.E.
COUNTY OF DU PAGE } APPROVED, by the
Du Page County Health Department, this 14th day of
July, 1954, at 1:00 P.M.
[Signature]
Chairman

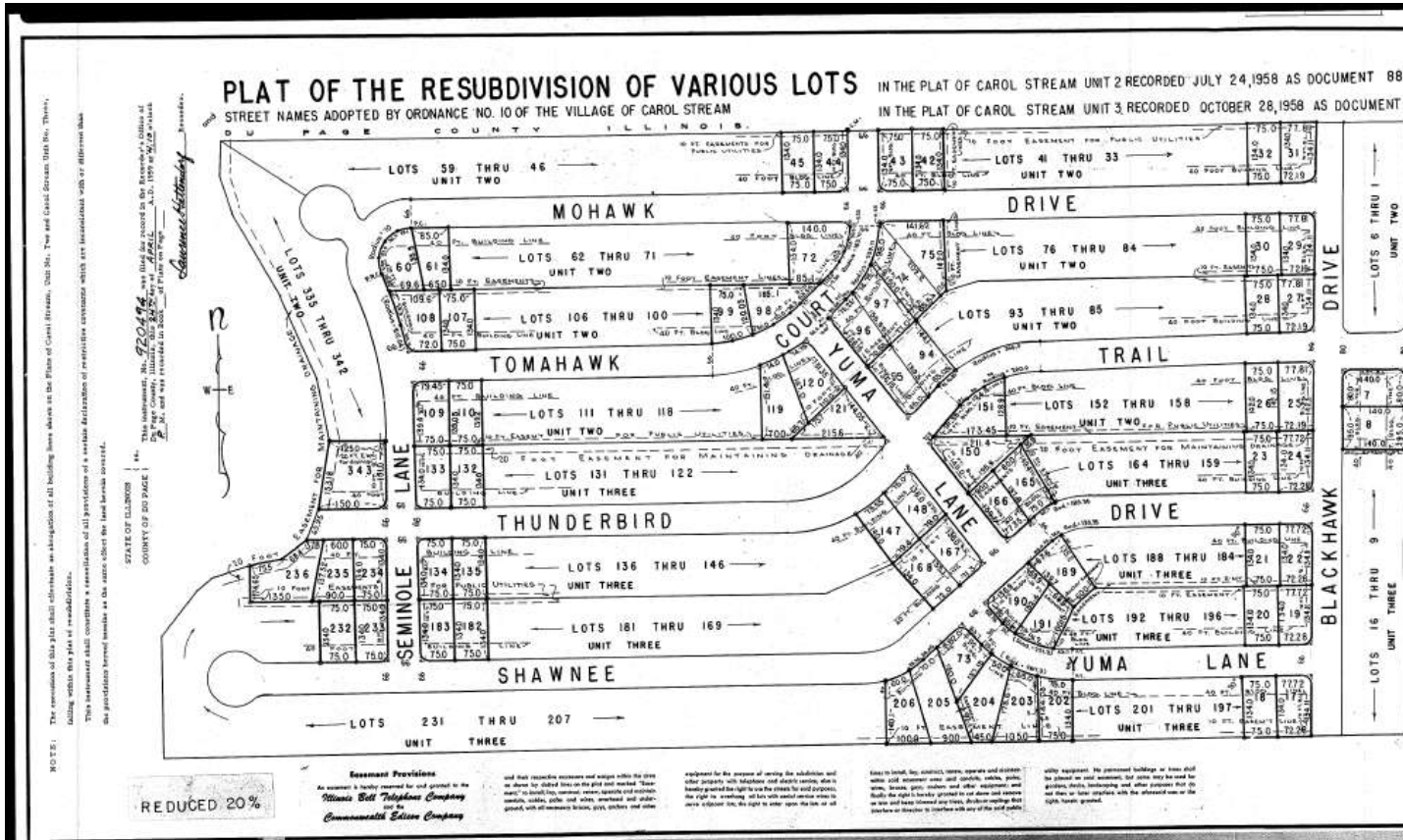
STATE OF ILLINOIS } S.E.
COUNTY OF DU PAGE } I, O. B. DING,
County Superintendent of Highways of the State of Illinois,
do hereby certify that the highway requirements set forth in
and hereon comply with the highway requirements set forth in
the regulations governing plats of subdivision and adopted by the
Board of Supervisors of Du Page County, Illinois, on the 14th day of
July, 1954, at 1:00 P.M.
[Signature]
County Superintendent of Highways

STREET NAMES WERE CHECKED AND APPROVED
DATE: 7/14/54
BY: O. B. Ding

STATE OF ILLINOIS } S.E.
COUNTY OF DU PAGE } I, Edwin Teske,
Commissioner of Highways of Bloomington Township, do
hereby certify that all matters pertaining to an highway re-
quirement as prescribed in the regulations governing plats
adopted by the Board of Supervisors of Du Page County, Illi-
nois, on the 14th day of July, 1954, at 1:00 P.M.,
have been complied with.
[Signature]
Commissioner of Highways

STATE OF ILLINOIS } S.E.
COUNTY OF DU PAGE } I, Clarence V. Wagoner,
County Clerk of Du Page County, Illinois, do hereby certify
that there are no additional proceedings on file in the office
of the County Clerk of Du Page County, Illinois, in connection
with this plat, and that the same are in accordance with the
requirements of the laws of the State of Illinois. I further
certify that I have received all of the statutory fees in connection
with this plat.
[Signature]
County Clerk





For Vol. of Plat, see Page 125 A
For Acknowledgment certificate, by William H. H. 152, see Miss. Book, 134 Page 331
Recorded in County Clerk's Office (S. 14-22) 508-20,729 10/1/77

Doc. # 920404
Page 125
10/1/77