When you leave, please leave this book
Because it has been said
"Every thing comes to him who waits"
Except a loaned book
THE CITY OF NEW YORK

BOARD OF ESTIMATE AND APPORTIONMENT

THE NARROWS TUNNEL

New York Bay Section—Trench Method

CONTRACT No. 4A

Contract Drawings
1 to 58

1925
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LIST OF CONTRACT DRAWINGS

CONTRACT NO. 1A.

Dwg. No.
1. Location Plan and Profile
2. Detail Plan and Profile, Station 110+92 to Station 136.
3. Detail Plan and Profile, Station 136 to Station 166.
4. Detail Plan and Profile, Station 166 to Station 196.
5. Detail Plan and Profile, Station 196 to Station 217+31.
13. Cross-Passage Details, Trench Portion.
16. Special Low-Tension Splicing Chamber, Trench Portion.
17. Refuge Niches, Ladders and Roof Pockets, Trench Portion.
22. 23' 10" Diameter Cast-Iron Tunnel, Connections Portion, Typical Sections in Earth, Earth and Rock, and Rock, lined.
23. Details of 23' 10" Diameter Cast-Iron Tunnel Ring in Earth, and in Earth and Rock.
24. Details of 23' 10" Diameter Cast-Iron Tunnel Ring in Rock.
27. Details of 24' 3" Diameter Cast-Iron Tunnel Ring in Rock.
29. Special Tunnel Construction near South Street Shaft, Connections Portion, General Plan.
Dwg.
No.
30. Special Tunnel Construction near South Street Shaft, Section AA, Station 213+11.
31. Special Tunnel Construction near South Street Shaft, Section BB, Station 213+55.
32. Special Tunnel Construction near South Street Shaft, Section CC, Station 214+25.
33. Special Tunnel Construction near South Street Shaft, Section DD, Station 214+42.
34. Special Tunnel Construction near South Street Shaft, Section EE, Station 214+68.
35. Special Tunnel Construction near South Street Shaft, Section FF, Station 214+74.
36. Special Tunnel Construction near South Street Shaft, Special High Tension Splicing Chambers 1 and 4.
37. Special Tunnel Construction near South Street Shaft, Special High Tension Splicing Chambers 2 and 3.
38. Special Tunnel Construction near South Street Shaft, Section GG, Station 214+90.
39. Special Tunnel Construction near South Street Shaft, Section HH.
40. Special Construction near South Street Shaft, Longitudinal Section MM.
41. Special Construction near South Street Shaft, Longitudinal Section NN.
42. Standard Splicing Chambers, Cast-Iron Tunnel.
43. Pipe Galleries, Refuge Niches, Ladders and Roof Pockets, Cast-Iron Tunnel.
44. Temporary Partition Wall in Shore Road Shaft, Brooklyn, Sections and Details.
45. Interior Construction at Shore Road Shaft, Brooklyn, Sections and Details.
46. Interior Construction at Shore Road Shaft, Brooklyn, Detail Plans.
47. Bulkhead and Roof Girders, Shore Road Shaft, Brooklyn.
48. Temporary Partition Wall in South Street Shaft, Richmond.
49. Interior Construction at South Street Shaft, Richmond, Sections and Details.
50. Interior Construction at South Street Shaft, Richmond, Detail Plans.
51. Bulkheads, South Street Shaft, Richmond.
52. Permanent Protective Blanket, Alternative Plan 1.
54. Electrolysis Bond Details.
55. Repair Slip Pier Extension Details.
56. Wharf Changes, Contractor's Area, Richmond.
57. Areas Available for Contractor's Plant in Brooklyn.
58. Areas Available for Contractor's Plant in Richmond.
THE NARROWS TUNNEL
CONTRACT NO. 4A
CONTRACT DRAWING NO. 2

DETAILED PLAN AND PROFILE - STA. 110+92 TO STA. 136
Note: For work to be done under each Part and for incidental work beyond the indicated limits for each Part see Contract Drawing No. 3 and Specifications.

Permanent Blanket (Part No. 3)

Approximate End of the Narrow's Tunnel

Surface Concrete

Tunnel Crown

Base of Road - Road Trench

Sinking Point

Net Line of Traffic Concrete

Center Line of North Outer Tube (Alternative Plan B only)

Center Line of South Outer Tube (Alternative Plan B only)

Alternative Plan 1 (Two Tubes)

Alternative Plan 2 (Four Tubes)

Legend

- Low Tension Splicing Chambers
- High

Cross Passages about 1065 c.f.c

Reference

For Index of Contract Plans see Contract Drawing No. 1

FILE NO C4A

THE NARROWS TUNNEL
CONTRACT NO. 4A
CONTRACT DRAWING NO. 4

Narrow's tunnel,

Plan

Profile

Detailed Plan and Profile - Sta. 166 to Sta. 196
ALTERNATIVE PLAN 2
EXCEPT EASTERN SECTION

ALTERNATIVE PLAN 1
AND EASTERN SECTION OF ALTERNATIVE PLAN 2

PAYMENT LINES, TRENCH PORTION
See Also Dwg No 8.
PAYMENT LINES, TRENCH PORTION

AT ENDS OF PARTS
See Plan Drawing No. 7

REFERENCE
For Index of Contract Plts. see contract
Drawing No. 1.
CROSS PASSAGE - TRENCH PORTION
CROSS PASSAGE - TRENCH PORTION

SECTION A-A

SECTION B-B

PLAN C-C
STANDARD SPlicing Chambers - Trench Portion

ELEVATION C-C
HIGH TENSION CHAMBER

ELEVATION D-D
LOW TENSION CHAMBER

NOTE: Joints in Conduit to be provided at every 20 ft.
CHAMBER and at one end of Chambes only.
The Plane Per Chamber located at center as shown.

SECTION E-E

HIGH TENSION 500-AMER. CHAMBER:
Chamber C appear 20 ft. long with H.T. Splicing Chambers located on C.

CHAMBER C:
Splicing Chambers located 20 ft. long with L.T. Splicing Chambers located on D.

HIGH TENSION SPECIAL CHAMBER:
Chamber C appear 20 ft. long with H.T. Splicing Chambers located on C.

LOW TENSION SPECIAL CHAMBER:
Chamber C appear 20 ft. long with L.T. Splicing Chambers located on D.

REFERENCE:
For details of Conduit Plan, see Contract Drawing No. 1.

THE NARROWS TUNNEL
CONTRACT NO. 4A
CONTRACT DRAWING NO. 75

FILE NO. 44A
SPECIAL SPICING CHAMBER - TRENCH PORTION
ENLARGED DETAIL OF ROOF POCKET

Notes:
- Ladders to be staggered along High and Low Tension Duct Benches and to be spaced 100 feet apart on each Benches.
- All work called for to be the same for Alternative Plan 1 (two tubes) and Alternative Plan 2 (four tubes).

Reference:
- For Index of Contract Plans, see Contract Drawing N.1284.

REFUGE NICHES, LADDERS AND ROOF POCKETS - TRENCH PORTION
SUMPS AND PUMP CHAMBERS-TRENCH PORTION
PUMP CHAMBERS IN OUTER TUBES, TRENCH PORTION
ALTERNATIVE PLAN 2

SECTIONAL PLAN
PUMP CHAMBER AT EASTERLY JUNCTION

SECTION B-B

THE NARROWS TUNNEL
DEP/RTMENT OF TRANSPORTATION
THE NARROWS TUNNEL
CONTRACT IN A
AGREEMENT OF DE
CONTRACT DRAWING NO
PREPARED BY

Scales of estimate: one inch equals 20 feet
Scale of plan: one inch equals 20 feet
Scale of section: one inch equals 20 feet
SECTION IN EARTH

SECTION IN EARTH AND ROCK

SECTION IN ROCK

23'-10" dia. CAST IRON TUNNEL
(UNLINED)
CONNECTIONS PORTION

REFERENCE
For Index of Contract Plans, see Contract Drawing No. 1

CONTRACT NO. 66
CONTRACT DRAWING NO. 81

THE NARROWS TUNNEL
BOARD OF ESTIMATE AND APPORTIONMENT
DRAFT OF 1895

FILE NO. C44A
SECTION IN EARTH

NOTES
Sections are drawn facing downstream and apply to either tube encasing duct arrangement. Ducts shown in position for North Tube (Eastbound). Duct arrangement for South Tube (Eastbound) opposite hand.

REFERENCES
For index of Contract Plans, see Contract Drawing No. 1.

SECTION IN EARTH AND ROCK

23'-10" Dia. CAST IRON TUNNEL (LINED)
CONNECTIONS PORTION

SECTION IN ROCK

CITY OF NEW YORK
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DEPARTMENT OF PUBLIC WORKS
THE NARROWS TUNNEL
CONTRACT N°-4A
CONTRACT DRAWING N°-22

[Signatures]
HIGH TENSILE STEEL BOLT

C1 GROUT PLUG
FOR 1/2 GROUT PIPE
DEVELOPED INSIDE VIEW OF RINGS

REFERENCE:
For Index of Contract Plans see
Contract Drawing No. 1.

DEVELOPED INNER FACE OF FLANGES

INSIDE VIEW OF SEGMENT

SECTION A-A
Connect Groove

SECTION B-B

TUNNEL RING
For Chain No. 3

Notes:
Each ring consists of 18 28 g 9A segments
Special segments and lever rings to be
provided as required. Review as required
by varying the 10" web dimension
Cast steel tunnel rings, if required by
the Engineer, shall conform to the
details on this sheet.

DETAILED OF 23'-10" Dia. C.I. TUNNEL RING IN EARTH
AND IN EARTH & ROCK

Approved

CITY OF NEW YORK
BOARD OF ESTIMATE AND APPOINTMENT
DEPARTMENT OF PUBLIC WORKS
THE NARROWS TUNNEL
CONTRACT NO. 4A
CONTRACT DRAWING NO. 23

FILE NO. C 4 A
DETAILS OF 23' 10" DIA. C/I TUNNEL RING IN ROCK

TUNNEL RING
See Shop No. 21-01 Scale - 1/2 inch = 1 foot

Notes:
Each ring consists of 9, 10, 11, and 12 segments
Special segments and repair rings to be provided as required. Top to be formed by varying 30° web dimension.
24-3 dia CAST IRON TUNNEL
CONNECTIONS PORTION

NOTES
Sections are drawn showing west end only when required by Engineer.

REFERENCES
For Index of Contract Plans
See Contract Drawing No. 1

THE NARROWS TUNNEL
CONTRACT No. 4 A

BOARD OF ESTIMATE AND APPORTIONMENT

THE NARROWS TUNNEL
CONTRACT DRAWING No. 20

J. C. W. T. R. C.

Sealed 5-2-98

FILE No. C-9 A
DETAILS OF 24" 3"dia C.I. TUNNEL RING IN EARTH AND IN EARTH & ROCK
DETAILS OF 18'-0" DIA. C.I. TUNNEL RING

Notes:
- Each ring consists of 1'6", 2'8", and 3'4" segments.
- Special segments and hanger rings to be provided as required. Refer to be formed by varying the 30" web dimension.
- Cool steel tunnel rings, if required by the Eng. need, shall conform to the details on this sheet.

REFERENCE:
- For Index of Contract Plans see Contract Drawing No. 1.
NOTES:
Payment Lines and Excavation Lines of Section A-A
apply for a distance of 30' each side of the end of the
C.I. Ring (see Fig. No. 41)
All Switch Points C.I. Rings are in their normal position with
relation to Base of Alt and E. Main Track (see Fig. No. 25)

REFERENCES
For Index of Contract Plans, see Contract Drawing No.
Section 'N N' see Contract Drawing No. 41

Approved

CITY OF NEW YORK
BOARD OF ESTIMATE AND APPORTIONMENT
DEPARTMENT OF THE COMPTROLLER
THE NARROWS TUNNEL
CONTRACT NO. 4 A
CONTRACT DRAWING NO. 30

FILE NO. C 4 A

[Signatures]
NOTES
Tunnel invert will be built to lines indicated as Alternative No. 1 unless otherwise directed.
The use of Tunnel invert as shown on Alternatives No. 2 will depend upon conditions of
sub-grade, drainage, etc. and will be determined by Engineer.

Payment Line for Excavation and Concrete
Net Line within which no rock shall project

ALTERNATIVE NO. 1

ALTERNATIVE NO. 2

Details and dimensions not shown, same as Alternative No. 1.

REFERENCES
For Index of Contract Plans, see Contract Drawing No. 1.
Section 'N' see Contract Drawing No. 41.

EASTBOUND TRACKS

WESTBOUND TRACKS

SECTION B-B
(STATION 213+75')

BOARD OF ESTIMATE AND APPORTIONMENT
OFFICE OF THE CHIEF ENGINEER

THE NARROWS TUNNEL
CONTRACT NO. 4 A
CONTRACT DRAWING NO. 31

Approved

Consultants

FILE NO. 644
SECTION C-C
(STATION 914+85)

EASTBOUND TRACKS

WESTBOUND TRACKS

NOTE: Special tunnel called for the tunnel being formed under the contractor's supervision. The tunnel will not be opened until the tunnel is completed and the determination is made by Engineer.

Payment Lines and Excavation Lines for Excavation and Concrete Work are shown on the working plans. Payment Lines and Excavation Lines will be maintained per the specifications and are determined by Engineer.

For a complete listing of all tunnel and excavation work, please refer to the Engineer's Notes.

References:
For more details, refer to the Contract Documents.

Approved:

[Signature]

[Date]
HORIZONTAL SECTION B-B
SPECIAL HIGH TENSION SPlicing CHAMBERS 1 AND 4

DETAILS HERE SHOWN APPLY TO CHAMBER 1, CHAMBER 4 OPPOSITE HAND BUT OTHERWISE IDENTICAL WITH CHAMBER 1 EXCEPTING OUTLINE OF NEW AND VERTICAL REINFORCEMENT AS PER DRAWING No. 23
REFERENCES
For Index of Contract Plans, see Contract Drawing No. 1.

DETAILS HERE SHOWN APPLY TO CHAMBER 2, CHAMBER 3.
EXCEPTING OUTLINE OFched AND VERTICAL REINFORCEMENT AS IN DRAW NO. 79.

THE NARROWS TUNNEL
CONTRACT No. 4 A
CONTRACT DRAWING No. 37

FILE N° 6 A
SECTION D-D

SECTION E-E
H.T. CHAMBER

SECTION R-A
L.T. CHAMBER

NOTES:
1. Electric Conduit and Side wall Chase shall be provided at every third H.T. Chamber and at one end of chamber only.
2. Deft per chamber located off center as shown.
3. High Tension Chambers shall be spaced 329 ft. e to c.
4. Low Tension Chambers shall be spaced 570 ft. e to c.

SECTION F-F
H.T. CHAMBER

SECTION B-B
L.T. CHAMBER

REFERENCE
For Index of Contract Plans see Contract Drawing No 1

STANDARD SPLICING CHAMBERS
(CAST IRON TUNNEL)
ROOF POCKET FOR OVERHEAD CONDUCTOR - IN EARTH TUNNEL

In Rock Tunnel, Roof Pockets and Electric Conductors may be omitted and U-Balls made longer.

PIPE GALLERIES, REFUGE NICHE, LADDERS AND ROOF POCKETS
(CAST IRON TUNNEL)

NOTES:
- Roof Pockets shall be spaced 10 ft. to 10 ft.
- Refuge Niches shall be spaced 25 ft. to 25 ft.
- In High Tension duct branches only.
- Ladders shall be spaced 30 ft. to 30 ft.
- In both duct branches (recessed)

REFERENCE:
- For Index of Contract Plans, see Contract Drawing No. 1.

City of New York
Board of Estimate and Apportionment
Office of the Chief Engineers
THE NARROWS TUNNEL
CONTRACT NO. 4A
CONTRACT DRAWING NO. 45
FILE NO. C 44
SECTION A-A

TEMPORARY PARTITION WALL IN SHORE ROAD SHAFT, BROOKLYN

SECTION B-B

SECTION C-C

SECTION D-D

PLAN OF SHAFT

Shewing location of Partition Wall

Scale 1" = 20' Foot

SECTION D-D

Scale 1" = 20' Foot

Shaft construction indicated thus: not included in this contract

CITY OF NEW YORK
BOARD OF ESTIMATES AND APPORTIONMENT
OFFICE OF THE ESTIMATE DEPARTMENT

THE NARROWS TUNNEL
CONTRACT NO. 44
CONTRACT DRAWING NO. 44

FILE NO. C 44
INTERIOR CONSTRUCTION AT SHORE ROAD SHAFT, BROOKLYN.
Final position of RGl

These girders to be placed but not fixed in this contract.

TYPICAL END CONNECTIONS

BULKHEADS & ROOF GIRDERS

SHORE ROAD SHAFT, BROOKLYN.
SECTION A-A
TEMPORARY PARTITION WALL IN SOUTH ST. SHAFT, RICHMOND

SECTION B-B
North and South Walls

SECTION C-C
Middle Wall

SECTION D-D

SECTION E-E

PLAN OF SHAFT
Showing location of Partition Wall
Scale 1"=10' Foot

Shaft construction indicated thus not included in this contract

REFERENCE
For Index of Contract Plans see Contract Drawing No. 1.

THE NARROWS TUNNEL
CONTRACT NO. 45
CONTRACT DRAWING NO. 48

SOUTH ST. SHAFT, RICHMOND
INTERIOR CONSTRUCTION AT SOUTH ST. SHAFT, RICHMOND.
INTERIOR CONSTRUCTION AT SOUTH ST. SHAFT, RICHMOND.
TYPICAL CROSS SECTION

NOTE:
No stone of the rip rap shall be longer
than two (2) feet in any direction

Reference
For Index of Contract Plans, see Contract Drawing No. 1

PERMANENT BLANKET
ALTERNATIVE PLAN 1
PERMANENT BLANKET
ALTERNATIVE PLAN 2

TYPICAL CROSS SECTION
Scale 1" = 20 ft

NOTE:
No stone of the rip rap shall be larger than two (2) feet in any direction

Reference:
For Index of Contract Plans, see Contract Drawing No. 1

Approved

CITY OF NEW YORK
BOARD OF ESTIMATE AND APPOINTMENT
THE NARROWS TUNNEL
CONTRACT No. 6A
CONTRACT DRAWING No. 53
FILE No. C 4A
Notes:

- Holes to be drilled and tapped dry without lubricant
- Full thread in tapped hole to be 1/4" long Threaded hole of same length 1/4" long
- Throat hole to match 7/16" whole length (31 gauge wire may be used)
- Tin clad all over after threading, edge off smooth
- Tin must be kept smooth of connector and
- Tin connector all over.
- Tin cable where it passes through connector
- Mount connector on stud
- Secure stud with full length of thread
- Clamp cable in connector
- Hand connector tightly while tightening nuts and
- Soldering all parts with solder:
- Use non-corrosive flux when threading and soldering
- All parts to be absolutely clean and dry when assembled
- Cable to be continuous around tunnel hole to be joined by
- Wound and soldered splice
- Paint all parts heavily with luminescent paint after complete assembly
- Cable not to be nearer to iron shell than 1/2 at any point

Typical Bond

Electrolysis Bond

Detail of Bond

Scale 1 inch

Section AA

Type A to be used where Cast Iron Tunnel construction is interrupted

Reference
For identification of Contract Plans see
Contract Drawing No.