



Description

- CTDOT inspects 5,394 roadway bridges, 1,795 of which are National Bridge Inventory (NBI) structures on the National Highway System (NHS).
- 4,028 of these bridges are state maintained; the remaining 1,366 are maintained locally or under another jurisdiction
- CTDOT defines a bridge as a crossing of at least six feet in length, including culverts. The Federal Highway Administration (FHWA) defines an NBI bridge as a structure measuring more than 20 feet in length.
- CTDOT has a distinct Major Bridge Program for large or expensive-to-replace bridges. 60 structures are currently categorized as Major Bridges.

State of Good Repair (SOGR)

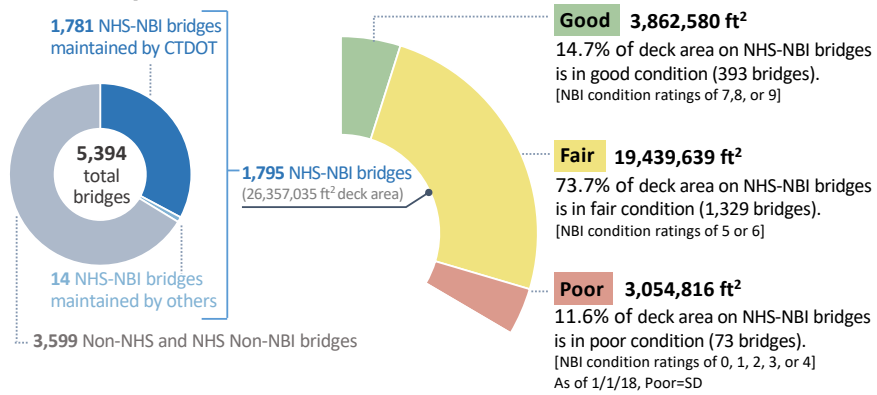
A bridge for which the condition rating for each of the three major components for a span bridge (Substructure, Deck, and Superstructure) or the structural condition of a culvert is rated at least a 5 on a 0-9 condition scale is classified as being in a SOGR.

Bridge Age

The average NHS-NBI bridge in Connecticut is 53 years old, which is 9 years older than the national average of 44 years. The state has a high percentage of Poor bridges (by deck area) compared to the national average.

NHS-NBI Inventory and Condition

Federal Requirements

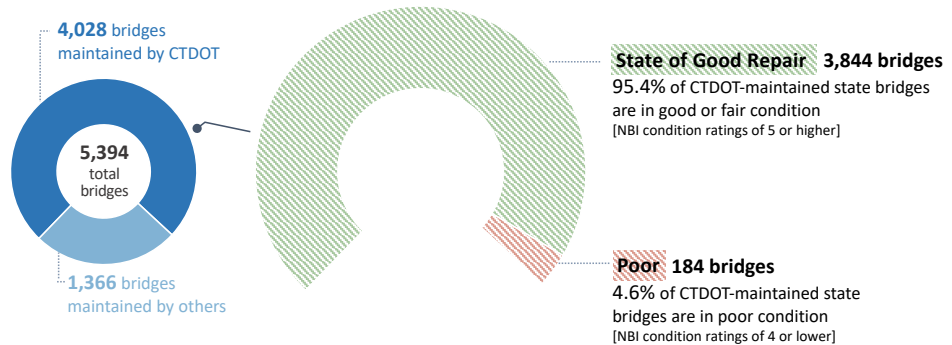


Based on CTDOT 3/14/19 NBI Submittal

Good-Fair-Poor defined by MAP-21/FAST Act

CTDOT-Maintained Inventory and Condition

State Goals

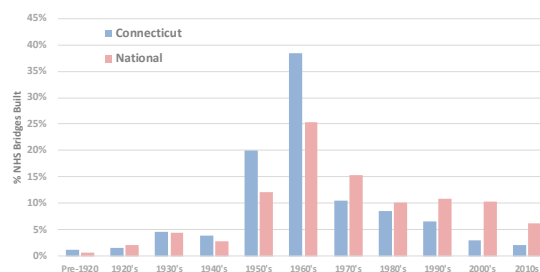


Based on CTDOT 3/14/19 Snapshot

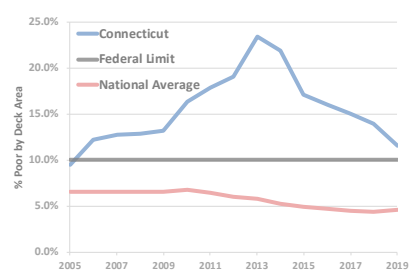
SOGR defined by CTDOT

History

Distribution of NHS Bridges By Decade Built



% Poor NHS Bridges By Deck Area



Based on National Data available from FHWA LTBP InfoBridge

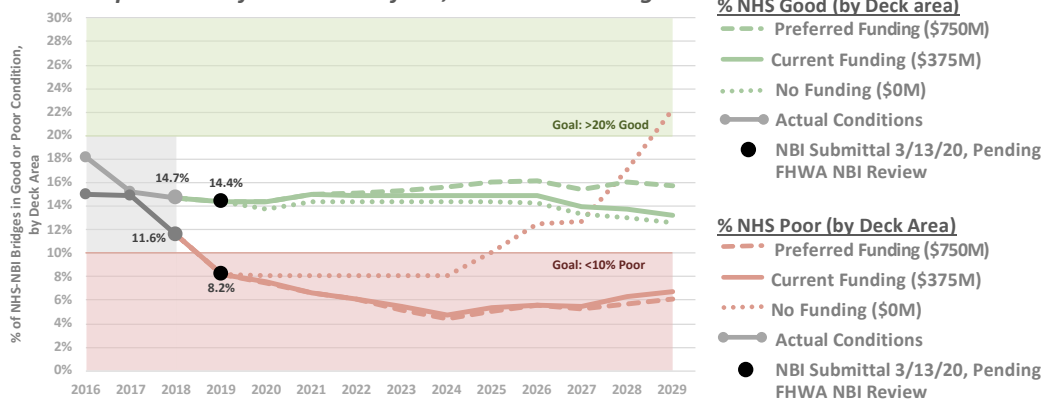


Connecticut Transportation Asset Management Plan Bridge



NHS-NBI Bridge Performance Projections

Federal Requirements for deck area for 1,795 NHS-NBI bridges



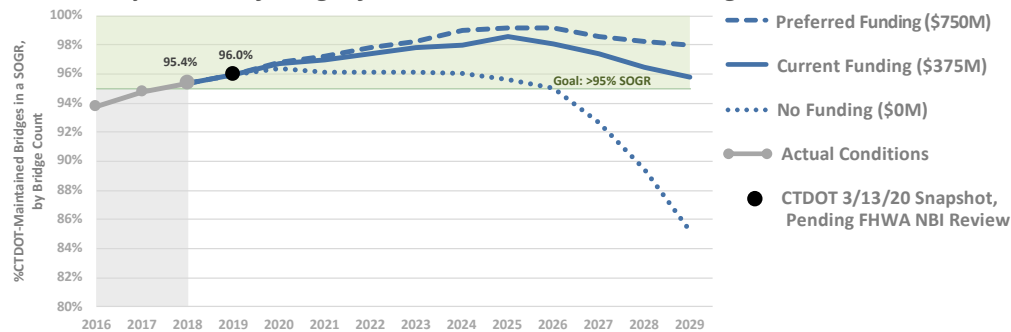
'No Funding' scenario includes routine bridge maintenance with other funding
Based on funding as of 12/31/19

Performance Projections at Current Funding Level (\$375M Budget)

End of Year	2020	2021	2022	2023	2024	Goal
NHS Good (by deck area)	14.3%	15.0%	14.9%	14.9%	14.9%	>20.0%
NHS Poor (by deck area)	7.5%	6.7%	6.2%	5.4%	4.7%	<10.0%

CTDOT-Maintained Bridge Performance Projections

State Goals by number of bridges for 4,028 CTDOT-maintained bridges



'No Funding' scenario includes routine bridge maintenance with other funding
Based on funding as of 12/31/19

Performance Projections at Current Funding Level (\$375M Budget)

End of Year	2020	2021	2022	2023	2024	Goal
SOGR	96.8%	97.0%	97.4%	97.8%	98.0%	95.0%

Performance Projections

The chart on the left depicts bridge condition for various funding scenarios. These were developed through an analysis program using CTDOT bridge condition data, as of May 2020.

Asset Valuation

\$14,945,774,020

Asset value is estimated using the replacement value. For bridges, replacement value is the product of deck area and unit construction cost. For 4,028 bridges: 34,757,614 sqft * \$430/sqft = \$14.9 billion.

Measures and Targets

CTDOT has set the following bridge condition goals:

Federal Requirements:

- 10% or less Poor by deck area on NHS-NBI bridges (Federal minimum is less than 10% Poor)
- 20% or more Good by deck area on NHS-NBI bridges

State Goal:

- 95% or more of State-Maintained bridges in a SOGR (State target)



Description

- There are 3,719 centerline miles of state-maintained routes and roads in Connecticut, 1,405 of which are on the National Highway System (NHS), including 346 Interstate miles.
- There are another 17,419 centerline miles of town maintained roads, 56 of which are on the NHS.
- 70.9% of CTDOT maintained roadways are flexible (asphalt) pavements, 28.7% are composite pavements (asphalt over concrete), and 0.4% are rigid (concrete) pavements.

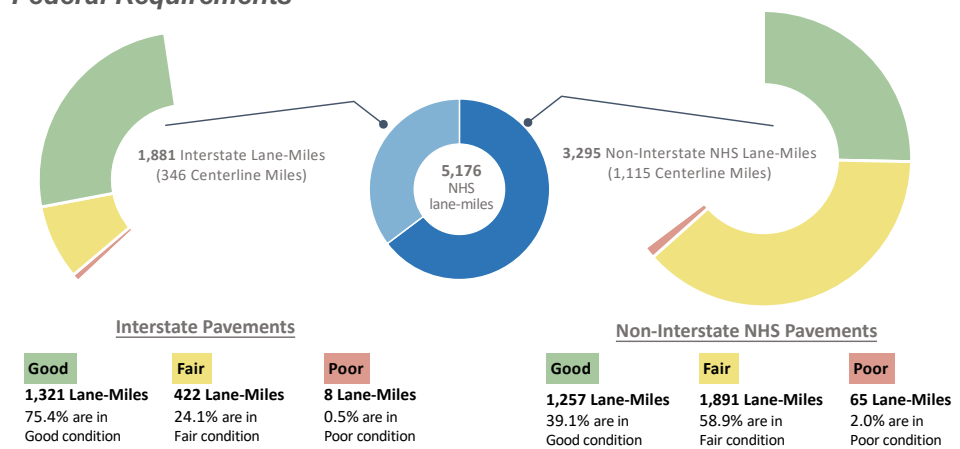
State of Good Repair (SOGR)

A pavement section for which the Pavement Condition Index (PCI) is 6 or greater is classified as being in a State of Good Repair (SOGR). The PCI is based on cracking, rutting, drainage disintegration, and ride. FHWA uses different condition measures for NHS pavements.

Pavement Age

The average Connecticut NHS pavement structure was constructed 44.8 years ago, and the average surface age is 7.8 years old.

NHS Roadways Inventory and Condition Federal Requirements

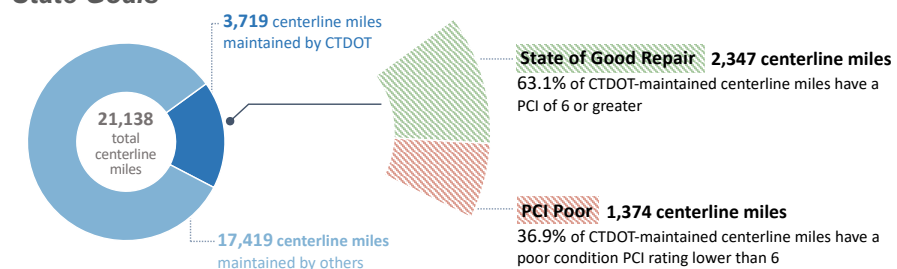


Note on Interstate: Total condition lane miles of 1,751 excludes 130 lane miles coded as bridge and zero lane miles missing/invalid.
Note on Non-Interstate NHS: Total condition lane miles of 3,213 excludes 81 lane miles coded as bridge and 1 lane mile missing/invalid. Totals include 159 NHS lane miles which are locally maintained, 91.8% in fair condition and 8.2% in poor condition.

Based on CTDOT 6/15/19 HPMS Submittal

Good-Fair-Poor defined by MAP-21/FAST Act

CTDOT-Maintained Roadways Inventory and Condition State Goals

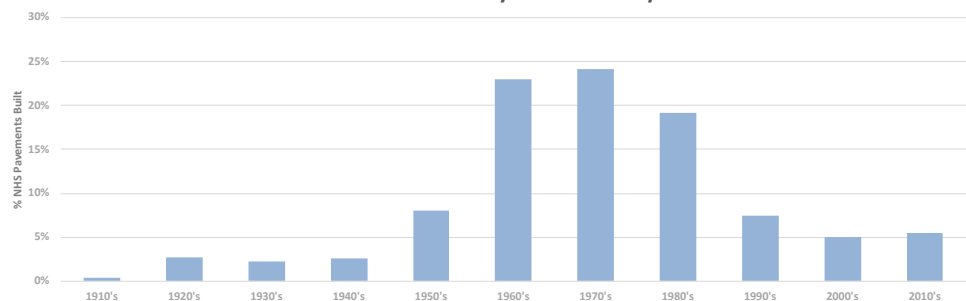


Based on CTDOT 6/15/19 Snapshot

SOGR defined by CTDOT

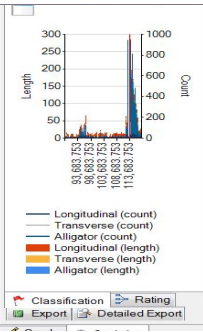
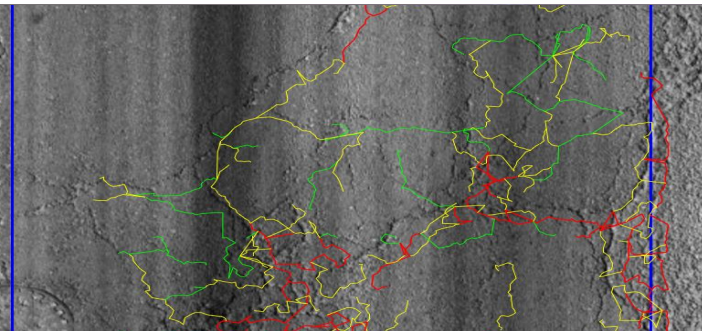
History

Distribution of CT NHS Roadway Pavements By Decade Built



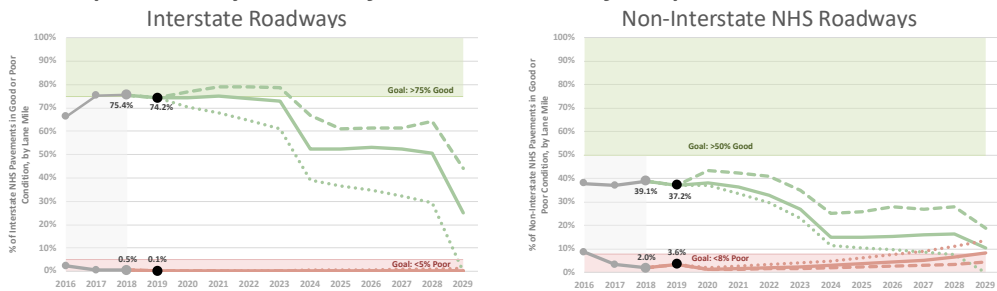


Connecticut Transportation Asset Management Plan Pavement



NHS Pavement Performance Projections

Federal Requirements by lane miles for 4,964 lane miles of NHS pavement



% Good (by lane miles)
 - Preferred Funding (\$450M) - Current Funding (\$130M) - No Funding (\$0M) - Actual Conditions
 ● HPMS Submittal 6/10/20, Pending FHWA Review

% Poor (by lane miles)
 - Preferred Funding (\$450M) - Current Funding (\$130M) - No Funding (\$0M) - Actual Conditions
 ● HPMS Submittal 6/10/20, Pending FHWA Review

Based on funding as of 12/31/19

Performance Projections at Current Funding Level (\$130M Budget)

End of Year	2020	2021	2022	2023	2024	Goal
Interstate Good	74.2%	75.1%	73.9%	72.8%	52.2%	75.0%
Interstate Poor	0.1%	0.1%	0.1%	0.1%	0.1%	<5.0%
Non-Int NHS Good	38.1%	36.4%	33.1%	27.0%	15.2%	50.0%
Non-Int NHS Poor	1.5%	1.7%	2.1%	2.4%	3.0%	<8.0%

Performance Projections

The charts on the left depicts pavement condition for various funding scenarios. These were developed through an analysis program using CTDOT pavement deterioration curves as of 2019.

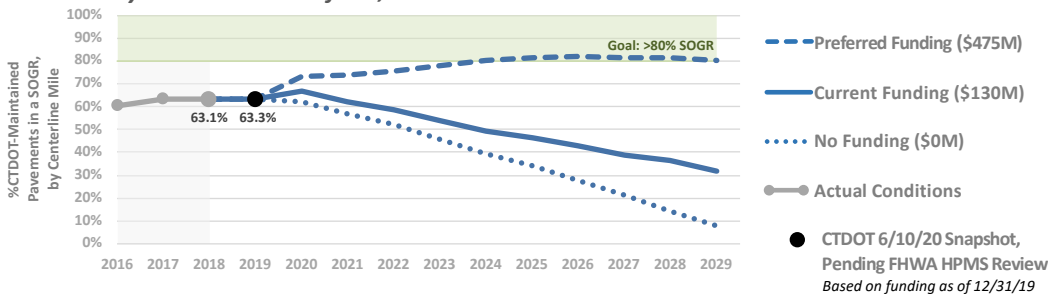
Asset Valuation

\$10,972,500,000

Asset value is estimated using the replacement value. For pavements, replacement value is the product of pavement area (SY) and unit construction cost. For 3,719 centerline miles of pavement: 104.5 million SY * \$105/SY = \$10.97 Billion

CTDOT-Maintained Pavement Performance Projections

State Goals by centerline miles for 3,719 centerline miles



Performance Projections at Current Funding Level (\$130M Budget)

End of Year	2020	2021	2022	2023	2024	Goal
SOGR	66.7%	62.3%	58.7%	53.9%	49.4%	80.0%

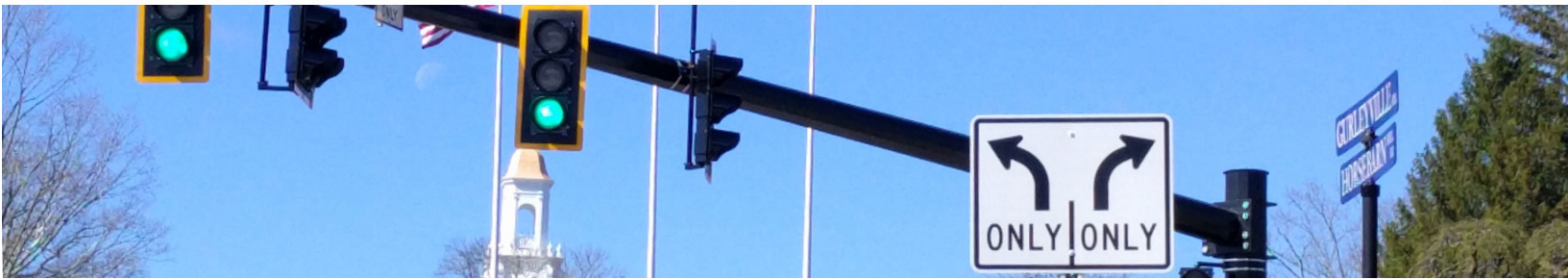
Measures and Targets

CTDOT has set the following pavement condition goals:
Federal Requirements:

- Interstate: 75% good condition and less than 5% poor condition (Federal minimum is less than 5% poor)
- Non-Interstate: 50% good condition and less than 8% poor condition

State Goal:

- 80% or more of State-maintained pavements in a SOGR (State)

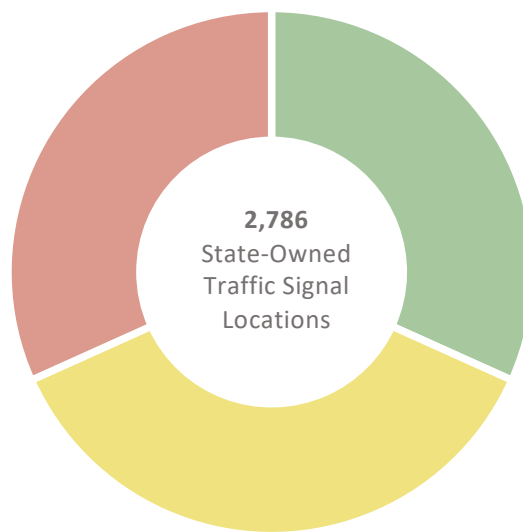


Description

- CTDOT is currently responsible for maintaining 2,786 State owned traffic signals:
 - 2,560 Traditional Traffic signals
 - 226 Overhead flashing beacons
- Of the 2,560 traditional traffic signals, 958 are part of 111 computerized traffic signal systems
- CTDOT defines a traffic signal unit as all traffic control equipment at a given intersection or location
- There are an additional 278 independent signs with flashers that are managed as part of the sign asset

Traffic Signal Inventory and Condition

State Goals



Good

884 Locations

31.7% are in Good condition (0-15 years old)

Fair

1,018 Locations

36.6% are in Fair condition (16-25 years old)

Poor

884 Locations

31.7% are in Poor condition (26+ years old)

Good-Fair-Poor and SOGR defined by CTDOT

Based on CTDOT 3/26/20 Snapshot

State of Good Repair (SOGR)

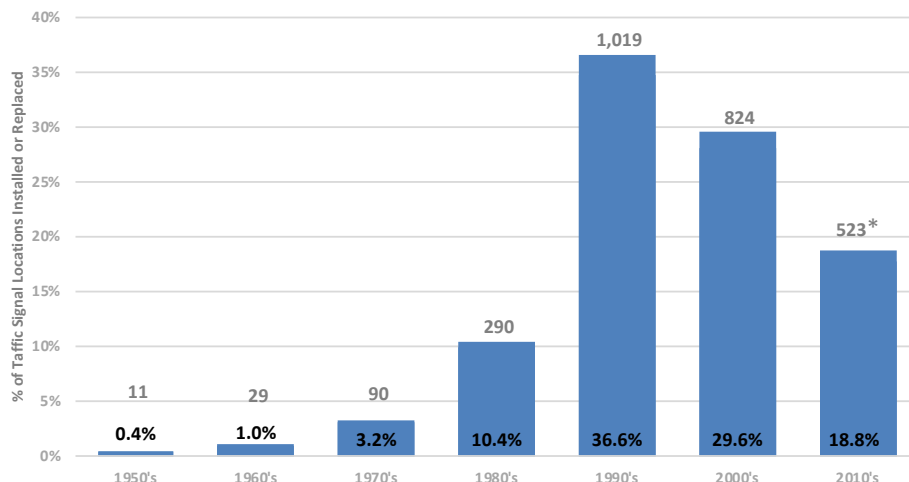
The State of Good Repair for traffic signals is determined to be 25 years of life based on expectations of controller and signal head life. Major component upgrades improve operation and safety of traffic signals but are not reflected in SOGR calculations.

Traffic Signal Age

- 31.7% of traffic signals are older than 25 years
- 1.4% of traffic signals are older than 50 years

History

Distribution of Traffic Signal Locations by Year Installed or Replaced



*Note that numbers do not include major upgrades such as 98 accessible pedestrian signals added in the 2010's

Based on CTDOT 2020 Snapshot

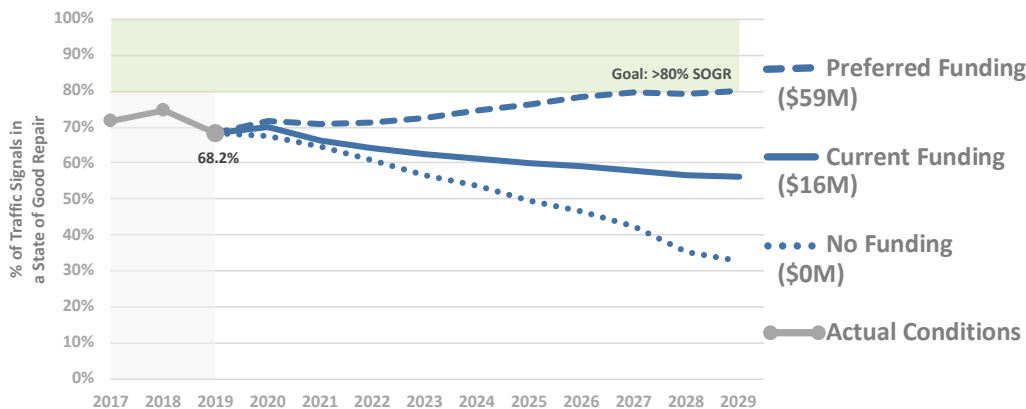


Traffic Signals



Traffic Signals Performance Projections

State Goals by traffic signal for 2,786 traffic signals



Based on funding as of 12/31/19

Projected Performance at Current Funding Level (\$16M Budget thru 2021, \$46M after)

End of Year	2020	2021	2022	2023	2024	Goal
SOGR	70.1%	66.3%	64.0%	62.3%	61.2%	80.0%

Note: \$10M of budget in 2022, 2023, and 2024 is designated for safety upgrades to existing equipment that do not affect SOGR rating.

Performance Projections

In order to maintain a State of Good Repair, roughly 160 traffic signals need replacement each year. Currently, approximately 55-75 traffic signals are replaced each year. Of those, 45-60 signals are programmed under the signal replacement program and 10-15 signals are replaced under other state projects annually.

Asset Valuation

\$676,900,000

Asset value is estimated using the replacement value. For traffic signals, replacement value is the product of traffic signal and unit construction cost.
 For 2,560 traffic signals :
 $2,560 * \$260,000 = \$665,600,000$
 For 226 Overhead flashing beacons: $226 * \$50,000 = \$11,300,000$

Measures and Targets

There are no Federal requirements at this time. CTDOT has set the following traffic signal condition goal:

State Goal:

- 80% or more of state owned traffic signals in a SOGR



Description

- CTDOT is responsible for maintaining approximately 248,000 signs (regulatory, warning, and guide) that are located on State owned and maintained roadways
- CTDOT defines a sign as a panel attached to a post(s) or sign structure and a sign assembly as the combination of sign panel(s) and their post(s), support, or sign structure at a single location.
- Overhead sign supports and foundations are managed as a separate asset

State of Good Repair (SOGR)

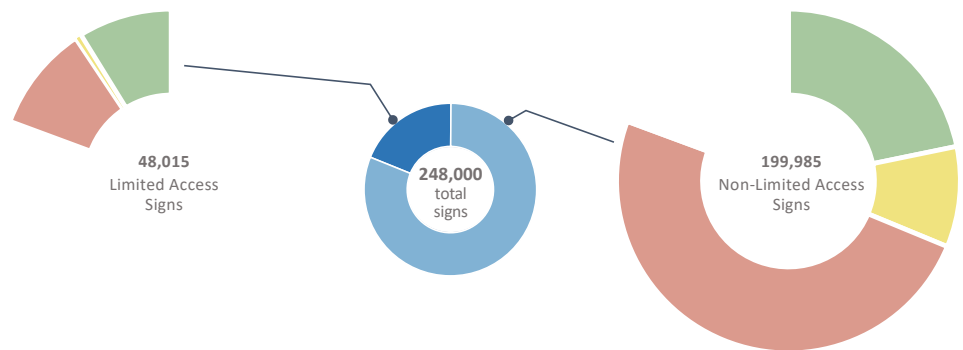
A sign installed within 17 years is classified as being in a State of Good Repair. This is based on expectations of retroreflectivity life. Retroreflectivity is a measure of the amount of light reflected by a surface back to the source of the light.

Sign Age

- Nearly 60% of all signs have exceeded their expected sign life or effective service life
- 36% of signs on limited access roadways are older than 25 years

Sign Inventory and Condition

State Goals



Limited Access Signs

Condition	Count	Percentage	Age Group
Good	21,825 Signs	45.5%	0-12 years old
Fair	1,455 Signs	3.0%	13-17 years old
Poor	24,735 Signs	51.5%	18+ years old

Non-Limited Access Signs

Condition	Count	Percentage	Age Group
Good	53,987 Signs	27.0%	0-12 years old
Fair	23,472 Signs	11.7%	13-17 years old
Poor	122,526 Signs	61.3%	18+ years old

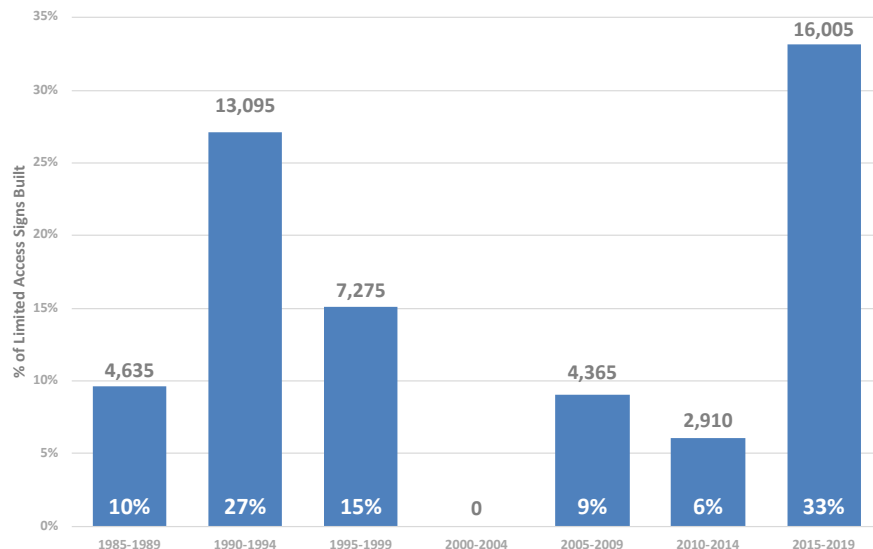
Note: revised inventory to remove duplicates from route overlaps – inventory validation still in progress.

Based on CTDOT 2013 inventory, with 2019 updates

Good-Fair-Poor and SOGR defined by CTDOT

History

Distribution of Limited Access Signs by Year Built

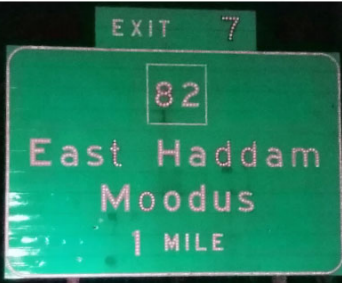


Based on CTDOT 2020 Snapshot



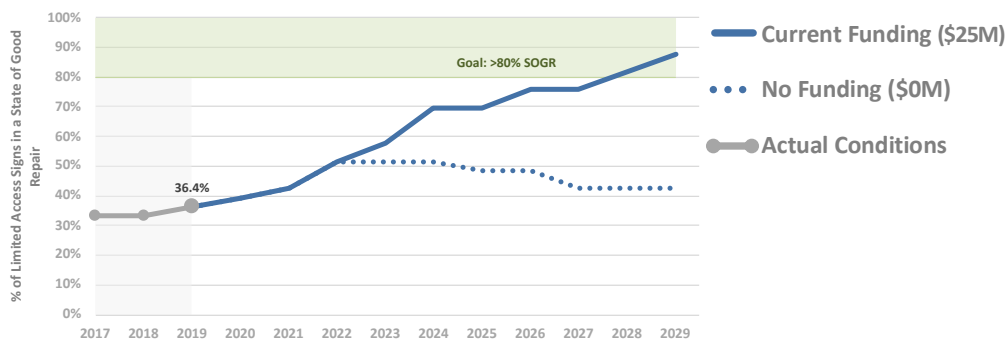
Connecticut Transportation Asset Management Plan

Signs



Limited Access Signs Performance Projections

State Goals by limited access roadway sign for 48,015 signs



Based on funding as of 12/31/19

Performance Projections

In order to maintain a State of Good Repair, nearly 14,600 signs need replacement each year. Currently, approximately 5,000 signs are replaced each year.

Asset Valuation

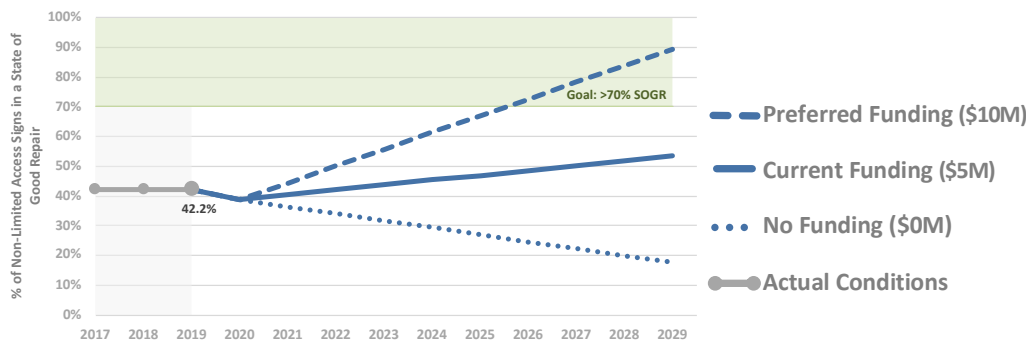
\$171,356,290

Asset value is estimated using the replacement value. For signs, replacement value is the product of square footage and unit construction cost.

Note: This value does not include the cost of overhead sign supports and foundations.

Non-Limited Access Signs Performance Projections

State Goals by non-limited access roadway sign for 199,985 signs



Based on funding as of 12/31/19

Measures and Targets

There are no Federal requirements at this time. CTDOT has set the following sign condition goals:

State Goals:

- 80% or more of signs on limited access roadways in a SOGR
- 70% or more of signs on non-limited access roadways in a SOGR



Description

- CTDOT is responsible for maintaining about 1,688 overhead sign supports on state maintained roadways
- Sign supports are made up of three categories:
 - 677 Cantilevers
 - 624 Full-Span
 - 387 Bridge Mounted
- CTDOT defines a sign support as the structure (horizontal member(s), post(s) and foundation) carrying sign panels or variable message boards at a single location
- Sign panels attached to the sign support are managed as a separate asset

State of Good Repair (SOGR)

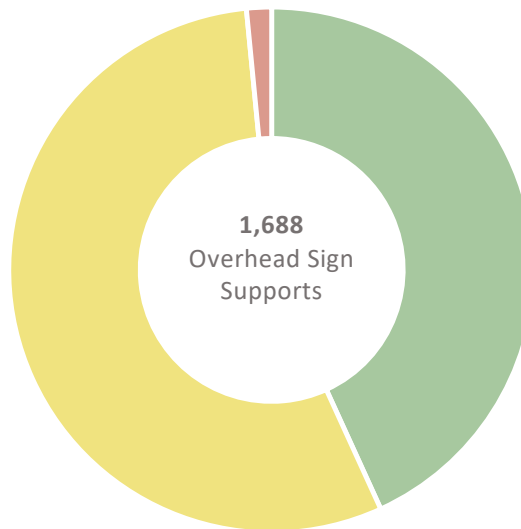
Sign supports with an overall rating of at least a 5 on a 0-9 condition scale are classified as being in a State of Good Repair.

Support Age

- Overhead sign supports have an estimated 34-year life expectancy
- 22.7% of sign supports are older than 34 years

Sign Support Inventory and Condition

State Goals



Good

729 Sign Supports

43.2% are in Good condition
[Condition ratings of 7,8, or 9]

Fair

933 Sign Supports

55.3% are in Fair condition
[Condition ratings of 5 or 6]

Poor

26 Sign Supports

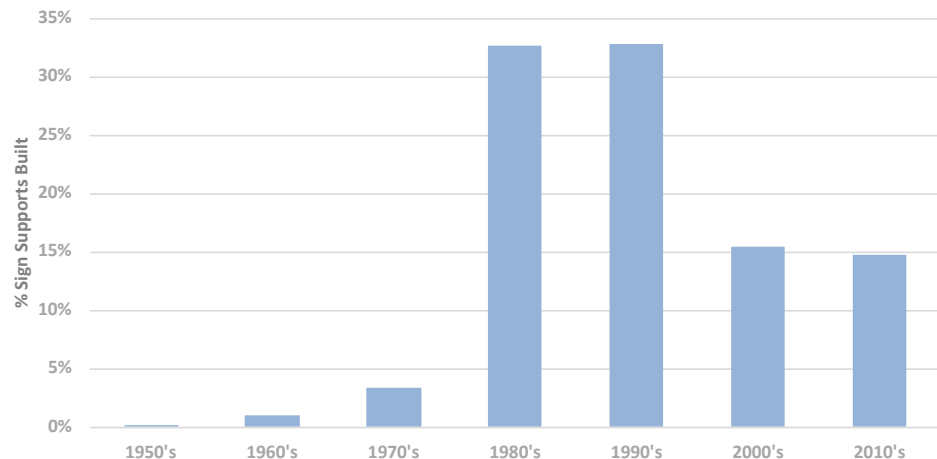
1.5% are in Poor condition
[Condition ratings of 0,1,2,3, or 4]

Good-Fair-Poor and SOGR defined by CTDOT

Based on CTDOT 4/8/20 Snapshot

History

Distribution of Sign Supports By Decade Built



Based on CTDOT 2020 Snapshot

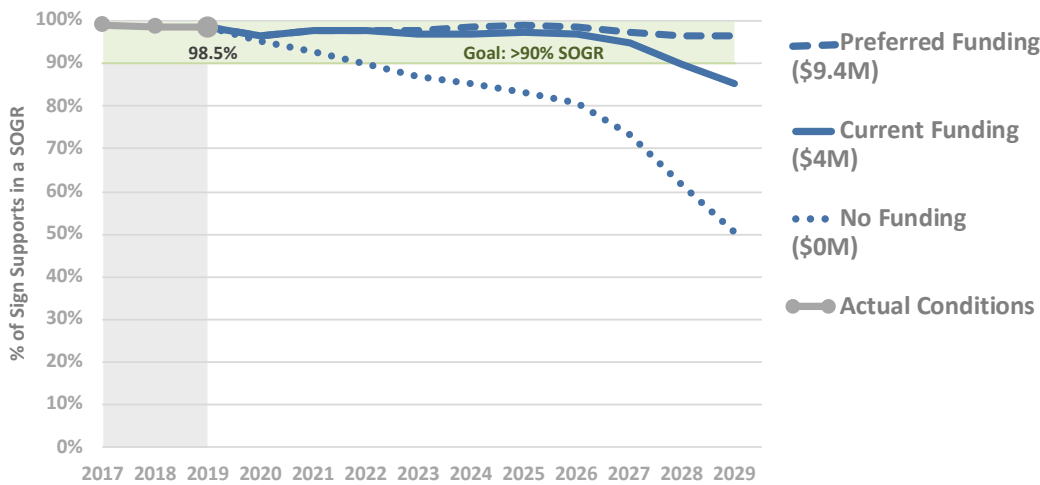


Sign Supports



Sign Support Performance Projections

State Goals by sign support for 1,688 sign supports



Projected Performance at Current Funding Level (\$4M Budget)

Based on funding as of 12/31/19

End of Year	2020	2021	2022	2023	2024	Goal
SOGR	96.3%	97.8%	97.9%	97.0%	96.9%	90.0%

Performance Projections

Sign support projections use deterioration curves for the overall structure condition rating. These curves are based on the 34 year service life expectancy of sign supports.

Asset Valuation

\$270,130,000

Asset value is estimated using the replacement value. For sign supports, replacement value is based on the average unit construction cost by type:
 Cantilever \$140,000 * 677 = \$94,780,000
 Full Span \$250,000 * 624 = \$156,000,000
 Bridge Mount \$50,000 * 387 = \$19,350,000

Note: This value does not include the cost of the sign panels.

Measures and Targets

There are no Federal requirements at this time. CTDOT has set the following sign support condition goal:

State Goal:

- 90% or more of sign supports in a SOGR



Description

- CTDOT is responsible for maintaining pavement markings on approximately 3,719 centerline miles of on State maintained roadways
- Pavement Markings include:
 - Line Striping
 - Symbols & Legends (arrows, crosswalks, etc.)
- CTDOT pavement marking applications are either water-based by State forces and Epoxy by Contractor

State of Good Repair (SOGR)

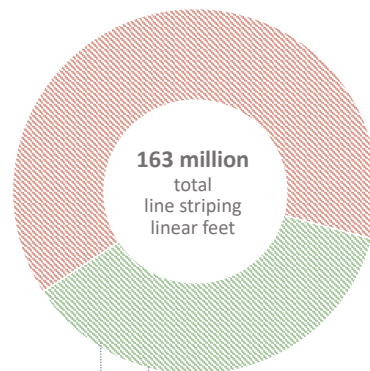
In-laid epoxy pavement markings installed within 6 years, epoxy pavement markings installed within the past 3 years and water-based pavement markings installed within 1 year are classified as being in a SOGR. This is based on expectations of retroreflectivity life and wear. Retroreflectivity is a measure of the amount of light reflected by a surface back to the source of the light.

Marking Age

- Nearly 63% of all line striping and 36% of all symbol and legend pavement markings have exceeded their expected service life.

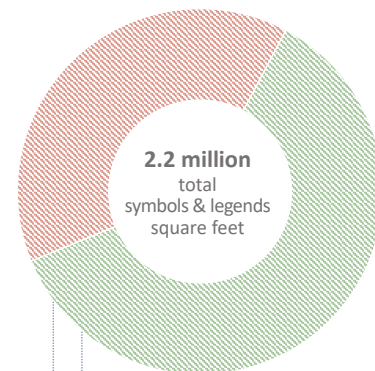
Pavement Markings Inventory and Condition: Line Striping and Symbols & Legends

State Goals



State of Good Repair 59.6 million linear feet
36.6% of line striping is in a state of good repair

Poor 103.4 million linear feet
63.4% of line striping is in poor condition



State of Good Repair 1.3 million square feet
61.0% of symbols & legends are in a state of good repair

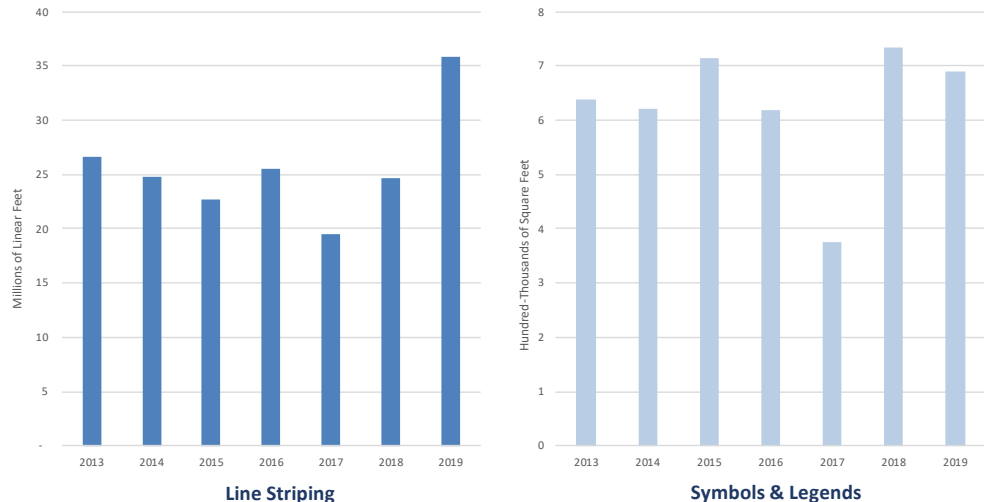
Poor 0.9 million square feet
39.0% of symbols & legends are in poor condition

SOGR defined by CTDOT

Based on CTDOT 2019 Snapshot

History

Line Striping and Symbols & Legends Installed Annually 2013 – 2019



Based on CTDOT 2019 Snapshot

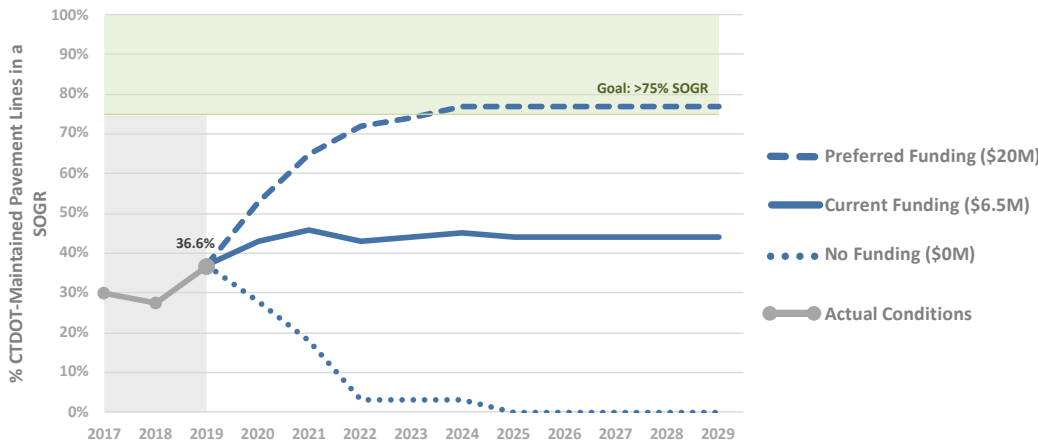


Connecticut Transportation Asset Management Plan Pavement Markings



Pavement Markings Performance Projections

State Goals by pavement lines for 163 million linear feet of line striping

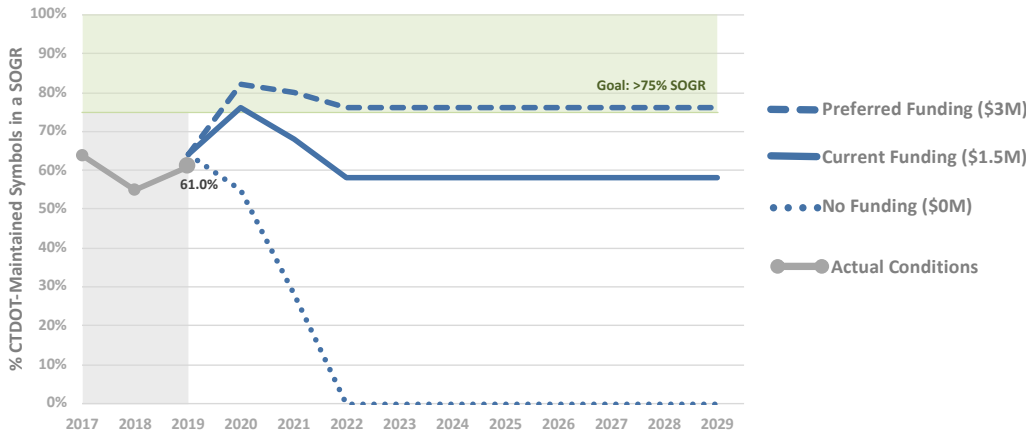


Based on funding as of 12/31/19

Performance Projections at Current Funding Level (\$6.5M Budget)

End of Year	2020	2021	2022	2023	2024	Goal
SOGR	43.0%	46.0%	43.0%	44.0%	45.0%	75.0%

State Goals by pavement symbols for 2.2 million square feet of symbols & legends



Based on funding as of 12/31/19

Performance Projections at Current Funding Level (\$1.5M Budget)

End of Year	2020	2021	2022	2023	2024	Goal
SOGR	76.0%	68.0%	58.0%	58.0%	58.0%	75.0%

Performance Projections

In order to maintain a State of Good Repair, nearly 54 million linear feet of line striping and 735,000 square feet of symbols & legends epoxy pavement markings need to be remarked each year. Currently, approximately 35 million linear feet and 700,000 square feet are remarked each year.

Asset Valuation

\$90,828,000

Asset value is estimated using the replacement value method. For pavement markings, replacement value is the product of square footage and unit construction cost considering epoxy only.

Line striping: 163 million LF * \$0.50/LF = \$81,500,000
 Symbols: 2.2 million SF * \$4.20/SF = \$9,328,000

Measures and Targets

There are no Federal requirements at this time. CTDOT has set the following pavement marking condition goals:

State Goals:

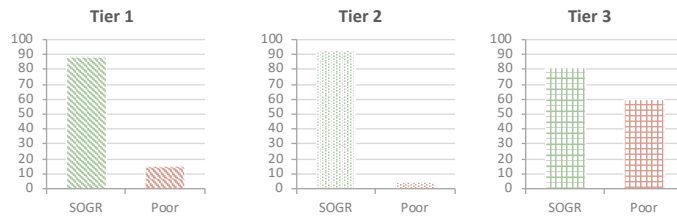
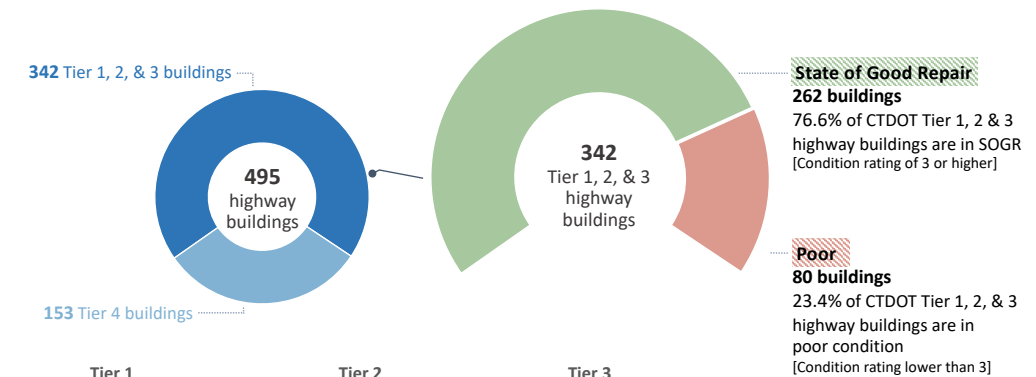
- 75% or more of line striping pavement markings in a SOGR
- 75% or more of symbols & legends pavement markings in a SOGR



Description

- CTDOT defines a highway building as a relatively permanent structure to house persons or property
- CTDOT owns 495 highway buildings classified into four Tiers:
 - Tier 1: significant structures normally occupied by employees or the public
 - Tier 2: significant structures not normally occupied by employees or the public
 - Tier 3: storage and portable office type structures
 - Tier 4: no asset management plan; portable storage containers, buildings managed by other entities or scheduled for demolition or sale

CTDOT-Maintained Inventory and Condition



- 103 Tier 1 buildings**
State of Good Repair : 85.4%
 - 73 Maintenance & Repair Facilities
 - 17 Rest Area / Weigh Station Facilities
 - 13 Administrative Facilities
- 98 Tier 2 buildings**
State of Good Repair : 94.9%
 - 94 Salt Sheds
 - 4 Specialty Facilities
- 141 Tier 3 buildings**
State of Good Repair : 57.4%
 - 96 Storage Structures
 - 45 Portable Office Structures
- 153 Tier 4 buildings**
State of Good Repair : Not tracked
 - 81 Portable Storage Containers
 - 61 Buildings Managed by Others
 - 11 Vacant Buildings Scheduled for Demolition or Sale

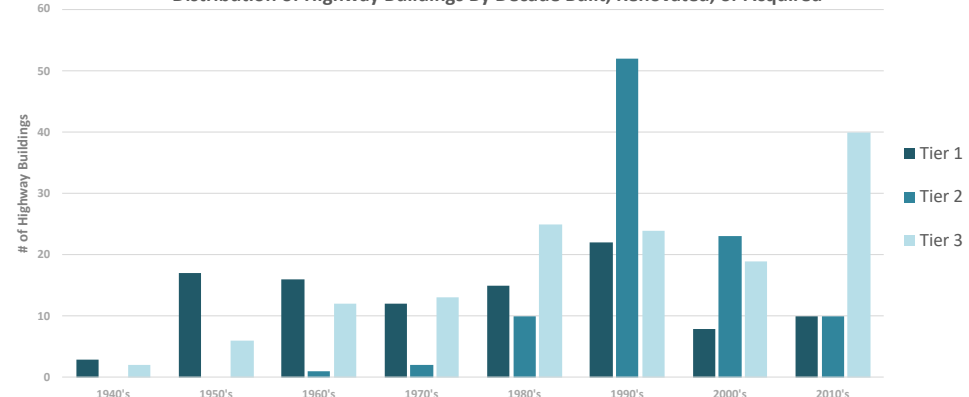
Based on CTDOT 4/19/20 Snapshot

State of Good Repair (SOGR)

- Buildings with an overall rating of 3 or better on a scale of 1-5 are classified as being in a SOGR
- Building ratings are a combinations of age-based and condition-based component ratings

History

Distribution of Highway Buildings By Decade Built, Renovated, or Acquired



Based on CTDOT 4/18/20 Snapshot

Building Age

- Building age is based on the date CTDOT acquired the asset or the date of the last (like new) renovation
- Tier 1 buildings have a 60-year life cycle with a 30-year mid-life SOGR upgrade
- Life cycles and the need for mid-life SOGR upgrades vary for Tier 2 & 3 buildings

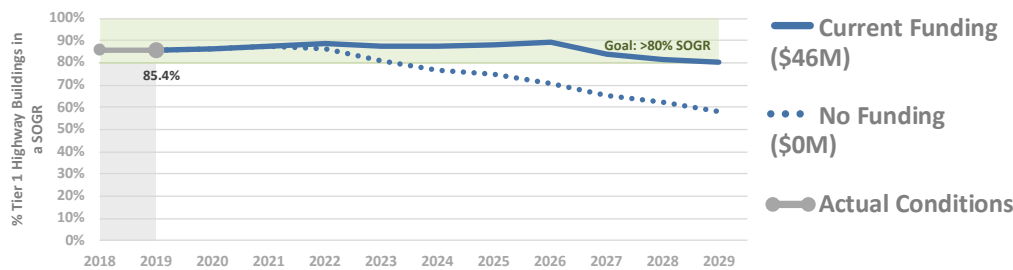


Connecticut Transportation Asset Management Plan Highway Buildings



Highway Buildings Performance Projections

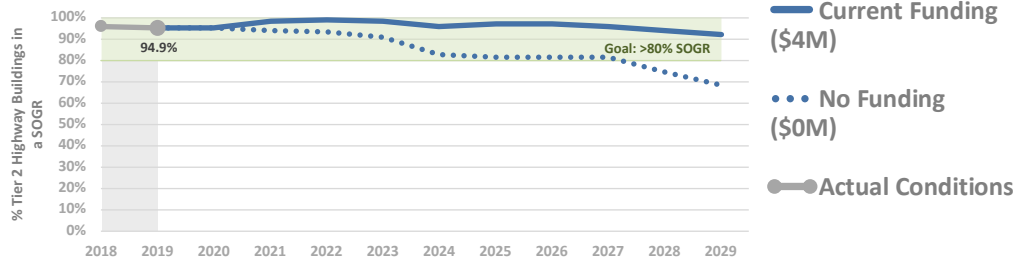
State Goals by Tier 1 highway building for 103 buildings



Tier 1 Performance Projections at Current Funding Level (\$46M Average Budget)

End of Year	2020	2021	2022	2023	2024	Goal
SOGR	86.4%	87.4%	88.5%	87.5%	87.5%	80.0%

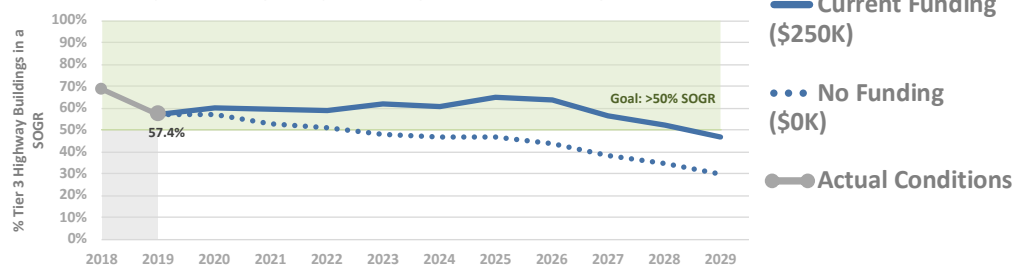
State Goals by Tier 2 highway building for 98 buildings



Tier 2 Performance Projections at Current Funding Level (\$4M Average Budget)

End of Year	2020	2021	2022	2023	2024	Goal
SOGR	94.9%	97.9%	99.0%	97.9%	95.8%	80.0%

State Goals by Tier 3 highway building for 141 buildings



Tier 3 Performance Projections at Current Funding Level (\$250K Average Budget)

End of Year	2020	2021	2022	2023	2024	Goal
SOGR	60.4%	59.8%	59.2%	62.3%	60.7%	50.0%

Tier 1, 2, and 3 projections based on funding as of 12/31/19

Performance Projections

Performance projection funding levels are based on the replacement value and include a 1.6 factor to account for non-building related project administration costs for engineering, rights-of-way, and construction incidentals and contingencies.

Asset Valuation

\$852,000,000

- Tier 1 Buildings: \$675M
- Tier 2 Buildings: \$165M
- Tier 3 Buildings: \$12M

Asset valuation is the replacement cost of the asset in current year dollars. For buildings, the replacement costs includes any site work necessary for the building to function such as water and sewer systems, generators, and fuel stations as applicable, etc.

Measures and Targets

Federal targets for buildings have not yet been established. The following State Goals have been set:

- Tier 1 Buildings: Maintain 80% in a SOGR
- Tier 2 Buildings: Maintain 80% in a SOGR
- Tier 3 Buildings: Maintain 50% in a SOGR