

Sample Risk List (as of September 2023)

This list captures risks from 19 Subject Matter Expert (SME) unit areas that a project may encounter. This list should be referenced by the Project Manager, Designer, and SMEs (the Project Team) in Concept Development when completing the Alternatives Matrix. Additionally, the Project Team should utilize this list to help identify major risks of the Preliminary Preferred Alternative, to populate the Risk Register; continue to update the Risk Register when initiating Preliminary Engineering and completing Final Design.

Project Management

1. Capital Program priorities, programmatic issues, or available funding may change, as project develops, and impact/delay project delivery.
2. Due to unforeseen (technical or non-technical) issues/challenges, Project's Purpose and Need may need to be modified.
3. Project scope (under-scope vs. over-scope), schedule, cost, and deliverables are not clearly defined or may change as the project develops.
4. Project may experience estimating and/or scheduling errors/omissions or may not reasonably meet an accelerated schedule.
5. Project may be affected by unforeseen delays due to consultant or in-house resource limitations.
6. Project may experience delivery delay or construction impacts, if lack of coordination issues with other projects/project teams (other projects overlapping, adjacent, or within project limits) are not resolved in a timely manner.
7. Lack of communication with or among the project team or stakeholders, if not resolved in a timely manner, may delay the Project.
8. PMs, staff members/SMEs and/or key supporting external stakeholders may change (lack of continuity) during the project delivery process, resulting in less buy-in from new staff.
9. As a result of changing Capital Project Delivery requirements, additional work on the project may occur, which would delay the project schedule and increase project costs.
10. Most PMs, select NJDOT staff members, select members from Contractor Industries, and select members from ACEC having inadequate training about new programs and revised guidance on Capital Project and Program Delivery require continual training.
11. Highway Safety Manual (HSM) Analysis, if not completed in Alternative Analysis during CD phase, may lead to project delays and revision of selected PPAs.
12. Changes in Department policies and procedures may present challenges to project development, especially for projects that are at the later stages of project development.
13. Insufficient knowledge among PMs, about NJDOT's Complete Streets policy or missing pedestrian and bicycle counts, may impact project scope, budget, and schedule (*also see Safety, Bike, & Ped for more detailed risks*).
14. External Stakeholders' actions/responses may impact project scope, budget, and schedule (*also see Community Relations for more detailed risks*).
15. Project may experience extraordinary shifts within the market (inflation, labor shortages, etc.) that will likely influence costs and ability to meet schedule more than is typical.

Community Relations

1. External stakeholders may change or now reverse support to the project due to construction activities (e.g., detours/noise/lighting) that are inconvenient/disruptive/objectionable to the community, resulting in changes or even lawsuits.
2. External stakeholders may not support all project recommendations or may make demands/request design changes late in project development.
3. A previously unidentified external stakeholder may be identified late who is opposed to the project.
4. External stakeholders may not be kept informed of a project's scope change resulting in reversal of support.
5. External stakeholders may make demands to incorporate non-standard or architectural items (fencing, fixtures, etc.) into the contract that are not-readily maintainable, resulting in changes.
6. Special agreements between State and Local government are not identified or external stakeholders may not/or timely execute the jurisdictional and/or electrical/signal agreements (*also see Jurisdiction for more detailed risks*).
7. External stakeholders may request design of proposed asset that discourages homeless access.

8. Community support for project may be impacted by climate change considerations, particularly in coastal communities.
9. Lack of community knowledge about future planned development or future needs of multi-modal traffic projections may undermine NJDOT's ability to address current/future project Purpose & Need and Goals & Objectives and leads to undermining project support (*also see Safety, Bike, & Ped for more detailed risks*).

Safety, Bike & Ped Planning & Complete Streets

1. A key design element, to address safety, NJDOT's Complete Streets Policy, or ADA requirements, may not be identified, or performed during Concept Development, and investigation may be required in future project phases that may impact project scope, budget, and schedule.
2. All Complete Streets and ADA requirements may not have been addressed or may not be supported by the municipality or other stakeholders, which may affect the scope or geometric design changes.
3. The roadway approaches (tie-ins) cannot reasonably/safely be used by residents and customers, which may affect the scope or geometric design changes.
4. While developing traffic staging on bridge work, failure to provide bicycle and pedestrian accommodation and detours, when live traffic lane is adjoining to temporary walking area, may lead to impacts.
5. Improperly completed LS CD Checklist may result in improper or inadequate accommodations for bicyclists and pedestrians. When CD Checklist issues must be corrected, it may result in scope, design, and schedule changes.
6. Inflexibility in addressing/incorporating low-cost safety countermeasures (in PPA) may lead to lost opportunities to enhance safety, which may require additional resources in order to address needs in a separate project.
7. Improper completion/erroneous entries in the NJDOT Complete Streets checklist may impact efforts to address safety, access, and mobility for all road users. When those errors are identified in a later phase may result in scope, design, and schedule changes.
8. The Purpose & Need or project goals may change between selection of the PPA and Final Design, which may create conflict with Complete Streets requirements (weakened), subsequently resulting in scope, design, and schedule changes.
9. Some new design elements, as part of Proven Safety Countermeasures, may not be acceptable to SMEs.
10. Consensus on safety and Complete Streets related improvements may not be reached between BSBPP and other project parties, including the Designer, FHWA, NJDOT PM, NJDOT SMEs, local officials, stakeholders, or the public, resulting in potential impacts to project scope, budget, and schedule.
11. Lack of guidance on seeking approval for installation of certain design elements on New Jersey's roadways to meet Complete Streets may compromise Safety and undermine the goals and objectives of the project.
12. Longer bicycle and pedestrian detours and/or safety measures are not adequately identified during Design, which impacts construction (*also see in Construction*).

Right of Way

1. All necessary ROW (fee, drainage, or utility parcels, or construction easements, etc.), or identifying correct ownerships or 3rd-party easements, or parcel revisions, may not be identified early, or correctly, or changes identified late, may lead to impacts to appraisals, funding, and/or negotiations, and impact project delivery.
2. All necessary ROW may not be available and/or may be required to be avoided, resulting in changes.
3. Provisions for drainage may be required for property owner.
4. ROW impacts are not fully considered (adjoining properties, zoning/building codes, drainage, parking, unique uses, adjacent MSE structure straps, equipment operations, demolitions, slope grading, environmental and hazardous waste, etc.), resulting in changes.
5. Design considerations for climate change regulations (i.e., raising roadways) may necessitate additional ROW acquisition (*also see Environmental for more detailed risks*).
6. ROW cost estimate may be inaccurate resulting in additional funding to be secured and ROW delivery schedule impact delays.
7. ROW relocation impacts are not found early, resulting in changes.
8. Liens on the property making it difficult to close and property that has more liens (loans) than property is worth.
9. Lack of subject matter experts i.e. license appraisers, lack of experienced staff impact ROW delivery.
10. Difficulty in finding owner replacement housing, especially with last resort housing, impact ROW delivery.

11. Court delays, challenges of bona fide negotiations, Encroachments, or “squatting” by non-property owners delay clearing of needed property, impact ROW delivery.
12. Asbestos survey for building acquisitions to be demolished is not completed prior to advertisement which impacts construction (*also see in Construction*).

Access

1. Maintaining adequate access during construction/staging may be difficult, resulting in businesses impacts.
2. Internal parking/circulation requirements are not identified/addressed, resulting in changes in Access or ROW.
3. Property owners are not correctly identified, causing the access process to be delayed, resulting in changes.
4. All necessary and required access modification/revocation are not identified early in design, resulting in changes.
5. Access modification/revocation may adversely disrupt an owner’s business, resulting in changes or lawsuits.
6. Property owner(s) may not be cooperative with access alterations, modifications, or revocations.
7. Project access approach and compliance with Access Code has not been agreed with SMEs raising the risk of rework in future project delivery phases.

Geometric Design/ADA

1. A key geometric design element may be overlooked during Concept Development and the Geometric Review process resulting in a Design Exception not being approved during PE/FD, with ensuing re-design to address previously unidentified/unapproved substandard controlling elements.
2. The project’s Purpose and Need Statement or Design Criteria (Access Level, Functional Classifications, etc.) may be overlooked, not be clear, or may change, leading to a selected alternative that does not meet Design Criteria, or resulting in rescission of Design Exception(s), or eventually requiring a late re-design, to address previously unidentified/unapproved substandard controlling elements or risk of compromised safety and operations.
3. The latest 3-year crash analysis which is performed for the Design Exception Report during PE or FD, may contradict the previous crash analysis performed during CD, resulting in redesign due to need to rescind previously approved CSDE’s or requiring new CSDE’s.
4. Grading around ADA ramps and driveways is not correctly designed, causing ponding after construction, requiring corrective actions.
5. Existing lane widths may not have been striped according to prior project plans, resulting in incorrect cross-slopes and irregular lane widths requiring corrective actions in construction.
6. *[Regarding orphan bridges, NJDOT approves Geometric Reviews and the State Transportation Engineer signs Design Exception Reports (DER) - when applicable. Local officials have significant input on these bridges as the approach roadways are local roads under their jurisdiction; as such:]* A local jurisdiction may object to substandard design elements that NJDOT intends to approve in CD resulting in risks to project scope during CD, FD, or Construction.
7. Existing utility pole offsets behind curb, or behind guide rail, or within the guide rail recovery area, do not meet minimum standards, resulting in guide rail redesign, curb line redesign, or utility pole relocation, or ROW impacts, each impacting scope, schedule and/or costs.
8. All Complete Streets and ADA requirements may not have been addressed, which may require geometric design changes.
9. Utility relocations may not account for conflicts with proposed ADA curb ramps, resulting in schedule or ROW impacts (*also see in Utilities*).
10. All necessary ROW (fee parcels, construction easements, etc.) or Access impacts may not be identified for assessing ADA design, resulting in schedule impacts.
11. The extent of meeting ADA, pedestrian, and bicycle accommodations may not have been addressed resulting in geometric design changes.
12. Significant redesign of the traffic signal layout, due to ADA retrofits, may require changes in scope (*also see Traffic Engineering for more detailed risks*).
13. During Concept Development, an alternative is selected utilizing only aerial mapping, which then may not be feasible when evaluated and designed during Preliminary Engineering, when survey is available, resulting in re-design and project delay.

14. Design of ADA ramps during Concept Development does not consider proposed traffic signals, existing/proposed underground utilities, or cross walk requirements resulting in re-design and project delay.

Jurisdictional-Maintenance Agreements

1. Apportionment of jurisdictional and maintenance responsibilities are not agreeable to project stakeholders.
2. External stakeholders may not/or timely execute the jurisdictional and/or electrical/signal agreements (*also see in Traffic Engineering, Operations-Maintenance*).
3. Orphan Bridge jurisdiction Transfer Agreement is not finalized during CD, impacting decisions on the scope of design repairs and/or replacement alternatives (*also see in Structures*).

Environmental

1. Environmental regulations/permit conditions may require extensive mitigation which in turn may impact the project (including need for additional ROW or additional design efforts/money).
2. Environmental agencies requirements on allowable construction permit windows or permit timing restrictions may impact project including construction schedules.
3. Changes in environmental regulations at the State and/or Federal levels including resultants of climate change issues may impact the project in form of changes to project designs, permit processing times, or increased mitigation requirements.
4. The initial environmental delineation may be inaccurate or unforeseen environmental conditions (e.g., hazardous materials, T&E species habitat, migrant birds, soil erosion etc.) may be identified late in design, resulting in new environmental impacts (permits) and/or changes to design/plans in construction, may cause delay in project and or additional money/resources.
5. Reviewing agencies may encounter application backlogs, causing delays in receiving permits and requiring a delay in the scheduled advertisement.
6. Excess borrow may be required and can cause a net-waste of material at end of project.
7. Stripped topsoil may not meet quality requirements as predicted from pre-construction soil tests. The amount of topsoil generated from stripping may be insufficient due to actual field conditions. A means to address these should be included in the contract.
8. Terrestrial crossing needs to be identified in CD and complete adequate hydrology and hydraulics design for the bridge/culvert should be done to ensure the selected structure type is not at risk of needing to be changed later in design.
9. Agency specific regulations should be addressed (e.g., Pinelands and Delaware and Raritan Canal Review Zone). Assuming waivers will be granted by the agencies that regulate these areas may cause delays, and the need for additional design work or right-of-way.
10. Conservation Easements may be considered Green Acres Encumbered. It is important to identify all GA parcels early in design, which includes potential easements held by towns and counties etc. Not identifying them early may lead to a delay in the schedules, need for mitigation, and additional ROW.
11. The environmental team should be kept informed when changes occur in design to allow sufficient time to conduct follow-up consultation or coordination prior to authorization requests without delay to the schedule or risk of losing fiscal year funding.
12. The project may encounter previously unidentified unsuitable materials or hazardous materials (Asbestos survey) or contaminated soils, which were to be used for on-site fill, resulting in new environmental impacts and/or changes (*also see Construction*).
13. The project may require intensive investigation of cultural / historic resources and SHPO coordination.
14. Strategy to conduct environmental mitigation has been identified. Opportunity to conduct onsite environmental mitigation vs. purchasing environmental bank credit.
15. Stormwater management BMP can be accommodated, and associated ROW acquisitions and impacts have been identified (if needed).
16. Failure to identify bats, birds or other T&E species living within an existing structure may result in schedule delay and unforeseen costs (*also see in Structures*).

Utility Management/Railroad

1. Utility asset locations/utility plans may be inaccurate/incomplete, resulting in changes to CPM scoped projects, or by NJDOT permit office, or by MUA permits in NJDOT jurisdiction.
2. The utility asset owner or contact information may not be correctly identified, resulting in changes.
3. Utility owner may not sign utility agreements including due to the new FHWA guidelines on Buy America.
4. Utility owners may be unable/unwilling to advance utility relocations as scheduled or in a timely manner, complicated by current NJDOT project demands or PSEG infrastructure mandated upgrades by the BPU.
5. Utility work takes longer than anticipated or inadequate workforce, or materials not available for a project due to extent of adjacent/regional projects, and impacts construction staging and traffic control.
6. Utility funding may be inadequate for asset owners to complete the work, particularly when utility field changes occur.
7. There may be communication breakdowns between the Designer and utility/railroad asset owners throughout the design phases including if cause is funding issues in the CD phase.
8. During design phase, any utility relocation involving a particular utility company, if not coordinated with all other utility owners impacted, may lead to further project changes/impacts.
9. During a construction change (or VECP), utility relocation changes are not coordinated with all utility owners.
10. All manholes, inlets, valve boxes, etc., requiring adjustments or reconstructions, may not have-all been identified.
11. Bridge plans may not have utilities incorporated and lead to changes.
12. Utility relocations may not account for unforeseen conflicts with drainage structures, inlets/pipes, etc.
13. Utility relocations may not account for conflicts with proposed lighting or traffic control devices, signal heads, poles, loops, etc., or power supply may be interrupted during construction.
14. Utility relocations may not account for conflicts with proposed ADA curb ramps, resulting in schedule or ROW impacts (*also see in Geometric Design/ADA*).
15. Utility relocation staging may not match project staging and/or maintenance of traffic especially when modification made by the State Contractor without proper evaluation of the Utility Accommodation Plan or when addressing key tie-in and shutoffs.
16. Utility Special provisions includes a utility weblink that is unapproved/not functioning leads to issues.
17. Schedule does not account for constraint that typically Utility Companies will not work nights/weekends which leads to project delays/issues.
18. Schedule does not account for the availability of materials or constraint of adequate lead-times to acquire necessary materials, impacting the project's schedule critical path.
19. Construction may be impacted by existing horizontal and vertical utilities proximity clearances (*also see in Construction*).
20. Plans do not account for constraint of Railroad crossings within 25 feet of construction results in issues.
21. [*Vertical Clearance (VC) of State/Local/Orphan structure over a Railroad Owner can become a risk if the Railroad Owner doesn't agree on the acceptable VC during CD*]. A Railroad Owner changes their position on the VC during PE or FD, which may not be adequately addressed, resulting in changes.
22. Utility work is temporarily halted or slowed due to reallocation of Utility personnel to restore storm damages/outages statewide in service areas and impacts construction schedule.
23. Failure to identify utility conflicts with proposed guide rail posts and compressive crash cushion foundation.
24. AMTRAK RR agreements take significantly longer to be processed internally within AMTRAK than some other utilities and railroads. It may lead to design delays if not properly considered in design scheduling.
25. Other utilities are restricted to share their as-builts plan per company's security regulations without an NDA.
26. Utilities shown on plan may not be properly labeled due to incorrect information provided by the utilities using GIS map and mark ups rather than construction as-builts. This may affect the entire design process.
27. In Initial Contact Letter Responses, Fiber Optic tenants are often misidentified, unidentified or they have changed names, ownership or maintenance responsibilities of Fiber Optic lines. Occasionally, this contributes to unexpectedly performing CD level utility tasks (e.g., preparing new UECAs) in PE phase.

Structures

1. A structural design that includes deep steel girders (or high skew) may create a problem with the girder's movement, twisting or roll over during erection, as they deflect when the deck is poured, resulting in changes.
2. Staged construction (especially on longer spans) may impact the structural design's final deck elevations, when considering possible deck differential deflection and/or proper rebar cover, resulting in design changes or requiring an additional closure pour stage.
3. The structural as-built plans may not reflect the actual condition, resulting in potential changes to the design, details, quantities, staging or erection planning on the contract plans during construction.
4. Data obtained through structural evaluation results may be inaccurate/may not be fully representative of actual structural conditions, requiring changes.
5. For deck replacements projects, it may not be feasible to obtain accurate field survey during design, to ensure that the deck geometry/elevations conform with the existing top of structural beams, resulting in the changes.
6. The type of bearings selected by the designer may not be suitable for the project, resulting in changes.
7. An initial, limited scoped deck replacement or narrowly scoped superstructure replacement may not account for structural repair needs for bearings/pads, resulting in late-identified changes during construction.
8. The protection of the elastomeric bearings during erection of girders (especially with large dead load camber) may not be adequately addressed, resulting in changes.
9. The required long lead time for rolling of specified beams and prefabricated beams not being manufactured properly or delivered on time may not be adequately addressed in the schedule, resulting in changes.
10. The existence of hazardous material adjacent to or bridge elements (asbestos pipes, lead based paint, etc.) may not be adequately addressed, resulting in changes.
11. The construction access (for demolition/erection) on bridges over railroads may not be adequately addressed, resulting in changes.
12. Construction activities may expose a previously unidentified condition in super/sub-structure, resulting in changes.
13. Structural and geotechnical considerations may change in coastal areas as a result of saltwater intrusion from sea level rise.
14. Failure to ensure latest standards/details for support structure design/fabrication (including sleeve connections) from NJDOT Structural unit will result in impacts.
15. ROW limits, underground utilities, and environmentally sensitive areas need to be determined to eliminate conflicts with proposed structural foundations.
16. Currently, much longer lead-times for Steel products need to be included in the schedule.
17. Orphan bridge jurisdiction Transfer Agreement is not finalized during CD impacting decisions on the scope of design repairs and/or replacement alternatives (*also see in Jurisdictional-Maintenance Agreements*).
18. Failure to identify bats, birds or other T&E species living within an existing structure may result in schedule delay and unforeseen costs (*also see in Environmental*).

Geotechnical

1. The project may not correctly/adequately identify areas of rock removal as Excavation, Unclassified or Presplitting, resulting in changes.
2. Driving deep foundations and vibrating sheeting can cause damage, settlement or vibration to existing structures and utilities adjacent to the work. Include Vibration Monitoring in the contract.
3. A Scour Analysis is an FD activity so PE structural foundation types can change, as well as incur a significant increase in cost at final design.
4. Designer schedule doesn't provide sufficient durations for foundation installation/testing/data interpretation, including the time required for the permit application and agency coordination in the construction schedule.
5. Lack of CI services inspector's work experience for specialty work as noted in the Special Provisions. The needs to ensure the postings require resumes to meet the special provisions list of specialty work, i.e., drilled shaft, micro-pile, soil nail, CSES, rock blasting or rock mitigation experience.
6. Boring not done in advance nor Geotech analysis included in CD report, requiring boring to then be verified during design, in order to avoid any construction delays.
7. Conceptual geotechnical analysis may not support future stormwater management design resulting in impacts.
8. Lack of available subsurface information in the CD and PE phases could result in the need to evaluate different substructure types in FD risking changes to the project design that could increase costs and impacts.

Traffic Engineering/Lighting

1. Age of traffic volumes (resulting lane use and signal timing) may not adequately account for continued population growth in the project area – congestion invalidates the original design solution.
2. Traffic Control Plans (TCP)/detours are complex, confusing, or cumbersome, resulting in changes.
3. Unacceptable congestion/queuing may occur in detours/construction area requiring late TCP changes.
4. Failure to address traffic, typical sections, construction staging, and/or detours may conflict with TCP or affect adjacent traffic patterns or operations, resulting in changes.
5. The TCP and/or construction staging plans may not correctly/adequately identify vertical/horizontal differential (tie-ins) between adjacent travel ways (and intersecting roadways), reflect minimum number of required lanes, minimum lane widths, median access or crossovers, temporary shoring, or temporary traffic barrier curb requirements, resulting in changes.
6. Failure to consider Specifications for TCP/lane closures, if missing, may cause issues.
7. Inaccurate or missing striping plan for each construction stage leads to issues (*also see in Construction*).
8. Failure to consider under-clearance restrictions at bridges to allow for TCP/MPT leads to issues.
9. External stakeholders may not/or timely execute the Traffic signal agreement (possibly tied to the lack of jurisdictional agreement execution), resulting in the non-acceptance of the traffic signal by the State, staging delays, project close-out delays and possible construction delay claims (*also see in Jurisdictional-Maintenance Agreements*).
10. Overhead wire conflicts with utility company's primary/secondary wires (PEOSHA, NESC), if not in compliance, will delay in the acceptance of the traffic signal, highway lighting system and hence will delay the project close-out.
11. Significant redesign of the traffic signal layout due to ADA retrofits may require changes (*also see in Geometric Design/ADA*).
12. Failure to ensure no utility facilities rests on the mast arm in the proposed condition, if traffic signal mast arm needs to be replaced, resulting in changes.
13. Failure to identify MASH approved safety devices during design results in changes in construction.
14. Failure to ensure timely Traffic Signal acceptance due to "last-minute" unidentified changes made in field (not identified in Final Design), resulting in delays.
15. Updating the standards and specifications for traffic design elements (backplates, lead pedestrian intervals, curb extensions, signposts, etc.) may impact schedules.
16. Traffic signals and other facilities may require new surveys as current surveys may be outdated (*also see Survey for more detailed risks*).
17. Due to shortage of staff, in-house design projects may negatively affect the projects timeline. Consider effects on projects timeline if survey work is being done by in-house, as opposed to consultants.
18. Compliance with ADA requirements requires major revisions or full redesign of traffic signals and other transportation facilities (*also see Geometric Design/ADA for more detailed risks*).
19. ADA ramps with push buttons (PB) located near-by may not have the required PB reach due to the presence of curb headers, may require field adjustments and/or re-design delaying the project.
20. Traffic Signal foundations are constructed first and not to final grade and then ADA ramps are built which results in foundation reveal greater than allowed by the Department. Such foundations will not be approved by the electrical inspector and will delay the signal acceptance.
21. Traffic Engineering related field changes, COPs, incomplete inspections, late punch lists, or certain devices and facilities not accepted or considered complete by Bureau of Traffic Engineering before the project, as a whole, is accepted by the Department, resulting in project (final) completion delay impacts or may require completion by NJDOT's maintenance crews.
22. Project Manager is unaware of potential traffic regulatory changes caused by the project resulting in impacts.
23. Failure to conduct a post-construction study for speed limits, advisory speeds, etc., by the design engineer may lead to increased costs because certain items need to be completed by Bureau of Traffic Engineering staff.
24. Project Manager is unaware of other projects in the area, Major/Minor Access Permits, Maintenance Work Orders, etc., and these may affect design review performed by the Bureau of Traffic Engineering.
25. Failure to provide lighting warrant at non-signalized intersections will delay FDS.

26. Failure to provide lighting analysis at crosswalks (existing/proposed) will delay construction and signing/stripping will not be accepted.
27. Traffic signal poles located at the center median must be evaluated and relocated.
28. A limited scope project may sometimes lead to full traffic signal redesign depending on the existing infrastructure (above ground and below ground).
29. If other agencies (fire department, rescue squad, turnpike, etc.) are involved, co-ordination must be identified.
30. If lighting on utility wood poles is proposed/modified/removed, the project must identify how this will be paid and handled to avoid construction delays. Certain utility companies require lighting agreement to be executed before installation.
31. All electrical materials including pre-approved and shop drawing items require Bureau of Traffic Engineering's approval before being installed. Failure to obtain the approval will delay traffic signal, highway lighting acceptance by DOT and result in delay of the project.
32. Any pedestrian scale lighting installed by the State as part of the project must be identified for the party responsible for the maintenance of such pedestrian lighting and the party responsible for the payment of monthly electric bill. It is the contractor's responsibility to transfer the maintenance to the desired party.
33. Failure to adhere to the 2012 Sample Plans for the Traffic Engineering Unit's CADD standards results in delay in Final Design.
34. Failure to update all existing files and/or plans to the new CADD standards, which results in additional time required to review.
35. Failure to use new CADD standards, seed file, color table, cell library, font and Electrical & Electrical English CADD Reference Manual, which results in additional time required to review.
36. Failure to update proposed condition to existing condition upon completion of construction of the State-owned traffic signal installation, may result in additional time required to review.
37. Failure to submit as-built traffic signal, electrical, and highway lighting CADD files to the Bureau of Traffic Engineering and Bureau of Maintenance for review and approval may result in additional time required to review.
38. Incomplete design file submissions to the Bureau of Traffic Engineering and Bureau of Maintenance will not be accepted, may result in additional time required to review.
39. Incomplete and unacceptable submission of as-built design files upon completion of the traffic signal installation by the electrical subcontractor to the State maintenance force will not be approved, may result in additional time required to review.
40. A Design solution may not consider existing traffic signal coordinated zone, resulting in inadequate traffic signal timings for corridor progression.
41. Failure to obtain as-builts and/or schedule field visits with NJDOT maintenance in timely manner will delay the design.
42. Conversion from HPS lighting to LED lighting may sometimes lead to include out-of-scope lighting work.
43. As-built plans and survey mapping do not match, resulting in additional time to reconcile the differences.
44. Required long lead time of items was not defined nor checked in design for project critical path items like traffic equipment, cabinets, traffic signal/light pole, traffic controller/PLCs, & MASH approved safety devices which may impact on construction schedule/delays.
45. Failure to check with SMEs prior to start of design to ensure there are no new specifications or standard drawings available but not yet released may result in changes.
46. Failure to obtain new electrical power connections or power disconnection confirmation from utility company during design may cause construction delays.
47. Failure to show proper detour signage for oversized vehicles especially for underpass/bridges or tunnels may cause construction delays.
48. Missing underground utility information can cause conflict and require relocation of traffic signal poles in construction which in turn increases cost and impacts the completion of the project.
49. Incorrect installation of traffic signal pole foundation could lead to replacement of the foundations and affect the completion of the project.

Sample Risk List (as of September 2023)

Pavement Design

1. Pavement may continue to deteriorate quicker than the scheduled CPM improvement can be delivered, resulting in redundancy of work by Operations and CPM and/or resulting in changes.
2. Pavement structures and conditions may vary significantly within project limits requiring multiple pavement treatments, making constructability challenging and possibly resulting in the need for breakout project(s).
3. Pavement assessments including cores, Ground Penetrating Radar (GPR) and Falling Weight Deflectometer (FWD) may not be extensive enough to adequately reveal all variations in existing pavement structures and conditions in order to adequately design pavement treatment(s), resulting in change orders or inferior quality projects.
4. The quantity of full depth pavement repairs may not be correctly/adequately identified causing a Limited Scope pavement resurfacing project to be changed/reclassified as a pavement reconstruction project, resulting in changes.
5. Pavement design may require an increase in roadway profile in floodways, under structures, in geometrically constrained areas, etc., resulting in changes.
6. A project with extensive quantities of full depth pavement repairs and/or partial reconstruction may not have correctly/adequately evaluated the pavement condition, geotechnical conditions, constructability, and traffic control, resulting in extensive, unanticipated field changes.
7. A pavement reconstruction project may not correctly/adequately evaluate subgrade below the pavement box for shallow/perched groundwater and soil with high percentage of fines, resulting in changes.
8. Extreme heat and more pronounced freeze/thaw cycles from climate change may result in more pavement stress than was anticipated during design.
9. On Limited Scope Resurfacing projects, the existing pavement may not have been paved according to prior project plans, or cross-slopes may not match as-built plans, resulting in cross-slopes and grades being incorrect in construction; therefore, as-builts should not be used to determine existing cross-slopes and grades and they should be field verified (survey) during CD.

Survey

1. Site conditions have changed during design that may require new or extended base mapping/surveying.
2. If base mapping is 5 years old or older, it may not accurately reflect recent, private construction within the project limits, requiring extensive field edits performed to determine its usefulness.
3. There may be a backlog in producing aerial mapping that may affect the project schedule.
4. Cross sections may not reflect the embankment widening required for guiderails, resulting in changes.
5. Complexity of the site or weather delays may extend time duration to complete survey control, survey, and base mapping preparation, causing project delays.
6. Survey accuracy may be impacted with planned but unknown new developments or other overlapping or nearby projects.
7. Survey data may not be compliant with NJDOT standards which may require rework in future project delivery phases considering the changes expected using ORD and digital project delivery.

Construction

1. Limitations of clearances, in-water access, work-zones/staging areas, site access, or equipment operations are not correctly or adequately identified, resulting in changes or safety concerns.
2. Seasonal impacts/restrictions or weather sensitive impacts/restrictions on construction activities/schedule are not identified, resulting in changes.
3. Extreme weather from climate change could result in changes to construction schedules. i.e., increasing occurrences of severe heat waves may require construction activities to be performed primarily at night when temperatures are lower, which increases costs.
4. Contract documents are interpreted incorrectly, and/or Contractor may perform the work (means & methods) in construction stage sequence different than contract documents, resulting in impacts.
5. Contractor may encounter unforeseen subsurface obstructions, or differing site conditions, or climatic conditions may be different than what was considered during project design, necessitating changes in construction techniques, and/or schedules, and/or change of plan prior to completing the construction work.

6. Asbestos survey for building acquisitions to be demolished is not completed prior to advertisement which impacts construction (*also see in Right of Way*).
7. Utility work takes longer than anticipated and impacts construction staging and traffic control (*also see Utilities for more detailed risks*).
8. Full-depth pavement repair areas not adequately identified, resulting in impacts to costs and schedule.
9. Contract documents do not adequately/correctly identify a utility asset location, resulting in changes.
10. Extensive coordination with external agencies, such as Army Corps, Coast Guard, NJ State Police, Railroads (i.e., Amtrak, NJ Transit, Conrail) etc., will be required and any requirements addressed in final contract documents causing additional costs and delays.
11. Work hour restrictions, including in-water, permitting, holiday, weather, utility restrictions, etc., may cause delays in schedule.
12. The effect traffic barriers and other devices may have on sight distance, access driveways, intersections, and turning radius was not accounted for.
13. Inaccurate or missing striping plan for each construction stage leads to issues (*also see in Traffic*).
14. Failure to consider traffic restricting cattle-chutes in TCP, impacting snow removal/plowing operations or maintenance of detours, may lead to delays.
15. Placement of guiderail post over drainage structures, retaining structures, utilities, sight distance for truck turning movement, and other features, etc., when not considered may lead to additional cost/delays.
16. Failure to consider stormwater management interruptions, if any, during each phase of construction may lead to additional costs/delays.
17. For resurfacing projects, failure to consider barrier resetting or height adjustment may lead to additional costs.
18. Construction may be impacted by existing horizontal and vertical utilities proximity clearances (*also see in Utilities*).
19. Failure to provide timely information to Bureau of Materials-NJDOT for the fabrication inspection and inspection/witness, mockup of bridge component fit-up witness, can result in shipping delays or improper erecting issues in the field. [*For example, fabrication of Beam Girders, Deck slabs, Diaphragms, Expansion joints, Bearings, four-Bar railings, Re-bar etc., also inspection for galvanizing or blasting, painting, anodizing, etc.*]
20. Longer bicycle and pedestrian detours and/or safety measures are not adequately identified during Design, which impacts construction (*also see in Safety, Bike & Ped*).
21. Construction excavation may expose a previously unidentified, unsuitable materials/condition than anticipated/presented in the contract documents, resulting in changes in disposal (*also see Environmental for more detailed risks*).
22. Environmental impacts/restrictions on construction activities/schedule are not identified, resulting in changes.
23. Failure to identify temporary structures and features such as walls, drainage, lighting, traffic signals, etc. results in impacts during construction leading to additional costs/delays.
24. Failure to check final bitumen laying temperature under extreme weather conditions (Cold/Heat). Failure to use admixtures under extreme cold and consider proper steps under extreme hot temperature, result in pavement cracks and more maintenance cost.

Statewide Mobility (Traffic) Operations/ITS

1. Restricted allowable lane closure hours may be detrimental to the project's design/scope, timely completion, or operations.
2. New technologies employed in the contract may not operate as anticipated, resulting in changes.
3. Technology originally designed for the project may become outdated by the time of the scheduled construction activity, resulting in changes.
4. An advanced project may be required, possibly outside the current project limits, to provide necessary, extensive dynamic message signs to address construction traffic control, resulting in changes.
5. Deployment of ITS and other electronic equipment in coastal areas may be affected by corrosive saltwater intrusion from sea level rise.
6. Failure to coordinate with on-going or anticipated contracts/projects, new developer projects, or not having detours approved by appropriate jurisdictions (nor obtaining a required Traffic Management Plan) may lead to issues.

7. School buses, mail carriers, fire trucks, emergency vehicles or other local traffic may require special maintenance of traffic provisions.
8. Failure to communicate any temporary or extended duration closures of emergency responder travel cut-throughs could lead to delays in emergency response in the project area.
9. Failure to accurately identify existing underground facilities (e.g. fiber optic cable and conduit) can result in changes during construction or loss of existing ITS System functionality.
10. Traffic signal timing may not be designed to work with existing Adaptive Traffic Signal System, resulting in changes during construction or loss of existing adaptive signal functionality.
11. Traffic Mitigation measures may not consider existing Adaptive Traffic Signal System or Controlled Traffic Signal System, resulting in an inadequate TM strategy.

Operations-Maintenance

1. A facility/asset may continue to deteriorate quicker than the scheduled CPM improvement can be delivered requiring an emergency/interim improvement to be advertised, resulting in changes.
2. High/non-maintainable landscaping plantings may be identified, or requested by external stakeholders, that are not easily/readily maintainable, resulting in changes.
3. Stormwater basins and Manufactured Treatment Devices (MTDs) may be identified, or requested by external stakeholders, that are not easily/readily/economically maintainable, resulting in changes.
4. All areas of surface runoff for ponding, hydroplaning and/or icing were not correctly/adequately identified, resulting in changes.
5. External stakeholders may not execute or timely execute the jurisdictional and/or signal agreements.
6. Sidewalk connectivity and maintenance delineations are not clearly established during design impacting (Jurisdictional and NJDOT Maintenance) Agreements.
7. Traffic signal electrical agreement may not be correctly/timely executed by all parties (possibly tied to the lack of jurisdictional agreement execution), resulting in the traffic signal not activated, staging delays, project close-out delays and possible construction delay claims (*also see in Traffic Engineering, Jurisdiction-Maintenance agreements*).
8. Climatic conditions may change at a faster rate than what was considered during project design. This may require more frequent maintenance than anticipated (*see also Environmental for more detailed risks*).
9. Increasing long lead times to procure (facility replacement) materials.
10. Failure to include a snow removal and emergency towing pay-item when a cattle chute is proposed, during winter months, may have impacts.
11. When adding only pavement overlay/resurfacing, failure to consider existing curb line or traffic barrier heights may lead to issues.

Bridge Maintenance

1. By not having the necessary coordination with the ROW engineering, delays in accruing the temporary and permanent easements, parcels, and all other ROW requirements may occur, resulting in prolonged delays in the project delivery. All necessary ROW (fee, drainage, or utility parcels, or construction easements, etc.) must be identified early in the project so the essential ROW is available.
2. Incorrect or inadequate identification of clearance restrictions, in-water access restrictions, work zones/staging area restrictions, site access restrictions, or equipment operations restrictions might lead to modifications or safety concerns.
3. By having inaccurate engineer's estimates, construction cost estimates for the structural components, items associated with the maintenance and preservation activities, the project may have underbid which may lead to funding issues/problems. This may ultimately affect the overall project delivery.
4. By not obtaining US Coast Guard approval for bridges over navigable waterways, the project may have construction schedule delays, which may lead to overall project impacts.
5. By not having the required US Army Corp of Engineer coordination and necessary permits, significant impact to the overall project schedule may occur. Lack of coordination with external agencies, such as Army Corps, Coast Guard, NJ State Police, Railroads (i.e., Amtrak, NJ Transit, Conrail), regional planning authorities (if required) etc., may result in additional costs and delays.

6. Any delays in obtaining Railroad permits from the railroad companies (CSX, AMTRAK) may significantly impact the project schedule. Timely coordination must be considered when coordinating with all the railroad companies.
7. By having utility conflicts that includes aerial and underground utilities (sewer, drainage, electrical & telecom), the project may have construction delays. Temporary measures must be taken by the contractor to maintain the uninterrupted services for the public.
8. Inaccurate interpretation of the existing conditions including inaccurate calculations of the existing fixed bridge items vs. the As-builts, the project may counter construction claims, which additionally can cause schedule and cost impacts.
9. By not obtaining precise measurements such as vertical clearances and weight limitations as per bridge requirements, permits for trucks/or construction vehicles may not be obtained in a timely manner. This can impact the construction schedule to a certain extent.
10. By not having SHPO coordination and involvement, project delays during construction may occur.
11. By having a limited number of suppliers for the approved materials on the materials list, project delays during construction may occur. Additionally, delays can also occur if a specific material required for the project is not on the NJDOT materials QPL, since unapproved materials cannot be used on NJDOT-led Projects.
12. Due to Buy America Laws, problems with acquiring certain materials may arise during construction.
13. NJDOT Traffic SME approval of proposed staging plans may lead to more complex staging alternatives and may lead to additional project costs. Any Detour plans prior to construction must be approved to avoid unnecessary delays.
14. Delays in installation of any electrical & mechanical components on a bridge may affect project schedule and bridge operation. This also applies to installing a sign structure on a bridge or erecting an ancillary structure.
15. Project delays could result during the maintenance or installation of scour countermeasures when the handling, storing, and disposal of hazardous riverbed material calls for special consideration. Lack of coordination with the DEP especially for permit requirements may lead to further delays in the project delivery.
16. Environmental regulations/permit conditions may require extensive mitigation which in turn may impact the project. *[Delays in obtaining the necessary permits may impact the project delivery]*.
17. Schedule delays and unexpected expenditures could occur if bats, birds, or other T&E species are not identified as residing inside an existing structure. For example, the presence of Bats at the bridge site during construction may lead to the closure of work on a number of bridges within the vicinity of the project. Therefore, it is extremely important to have an accurate environmental delineation at the initial stages of the project.
18. Any delays in acquiring the Categorical Exclusion Documents (CEDs) can seriously impact project delivery.
19. If the project is not advertised correctly, construction issues may arise.
20. By forecasting inaccurate project deliverables, timing cost, and scope (under-scope vs. over-scope) may significantly impact the intent of the overall project & its delivery. Inaccurate estimation & scheduling errors & internal resource constraints may also lead to unplanned delays.
21. By not having proper coordination with other projects/project teams to resolve any overlapping issues during construction within the project limits may lead to delivery delays or construction disruptions.
22. Agency specific regulations should be addressed early in the PE/FD phase *[e.g., Pinelands and Delaware and Raritan Canal Review Zone]*.
23. Improper interpretation of the contract documents and/or the contractor's performance of the job (means and methods) in a different order than the construction stage sequence may also impact the project schedule & overall delivery.

Movable Bridges

1. By having inaccurate construction cost estimates for the Mechanical or Electrical work, the project may have underbids which may lead to funding issues/problems.
2. By not having all necessary permits and /or ROW, the project may have delays until permits are procured, which may impact the design and construction schedule.
3. By having incomplete information provided by sub consultants/vendors/ third party, the project may have incorrect designs, which may impact the design and construction schedule.
4. NJDOT Traffic SME approval of proposed staging plans may lead to more complex staging alternatives and may lead to additional project cost.

Sample Risk List (as of September 2023)

5. By not obtaining US Coast Guard approval for the movable span closure, the project may have construction schedule delays, which may lead to overall project impacts.
6. By having utility conflicts, project delays may occur.
7. By having service utilities (water, sewer, electric and telephone) to the bridge house being relocated while having to keep the bridge in service, project delays during Construction may occur, if the contractor fails to get temporary lines.
8. By having an inaccurate span balance calculation for the lift span due to existing conditions, the project may have construction claims and project delays, which may lead to schedule and cost impacts.
9. Issues with lift span rope & Socket manufacturing/quality and shop castings, may lead to project delays.
10. By not obtaining precise measurements and documenting thoroughly existing machinery condition and clearances, delays and claims during Construction may occur.
11. By not having SHPO coordination and involvement, project delays during Construction may occur.
12. By having long lead mechanical/electrical items, barrier and warning gate items, project delays during Construction may occur.
13. The possibility of delayed installation of Electrical components (Drive and PLC testing/installations), may affect project schedule & Bridge operation.
14. By having a limited number of suppliers for the FRP and aluminum median barrier, if used for the lift span, project delays during Construction may occur.
15. By having Buy America Laws, issues with the FRP sidewalks, mechanical & electrical equipment may occur during construction.
16. By having additional stage line stringers required, or some existing stage line stringers requiring relocation, project delays during Construction may occur.
17. By having issues with high lead times for the new ropes for the rope replacements, the project may have construction delays.
18. By having deck removal and unforeseen additional section losses to primary member top flanges being found requiring repair or replacement, the project may have additional project cost and possible project delays.
19. By having scour countermeasure installation, handling, storage and disposal of hazardous riverbed material which requires special consideration, project delays may occur.
20. If the project is not advertised correctly and a non-Code 41 prime contractor bids on the work, construction issues may arise.