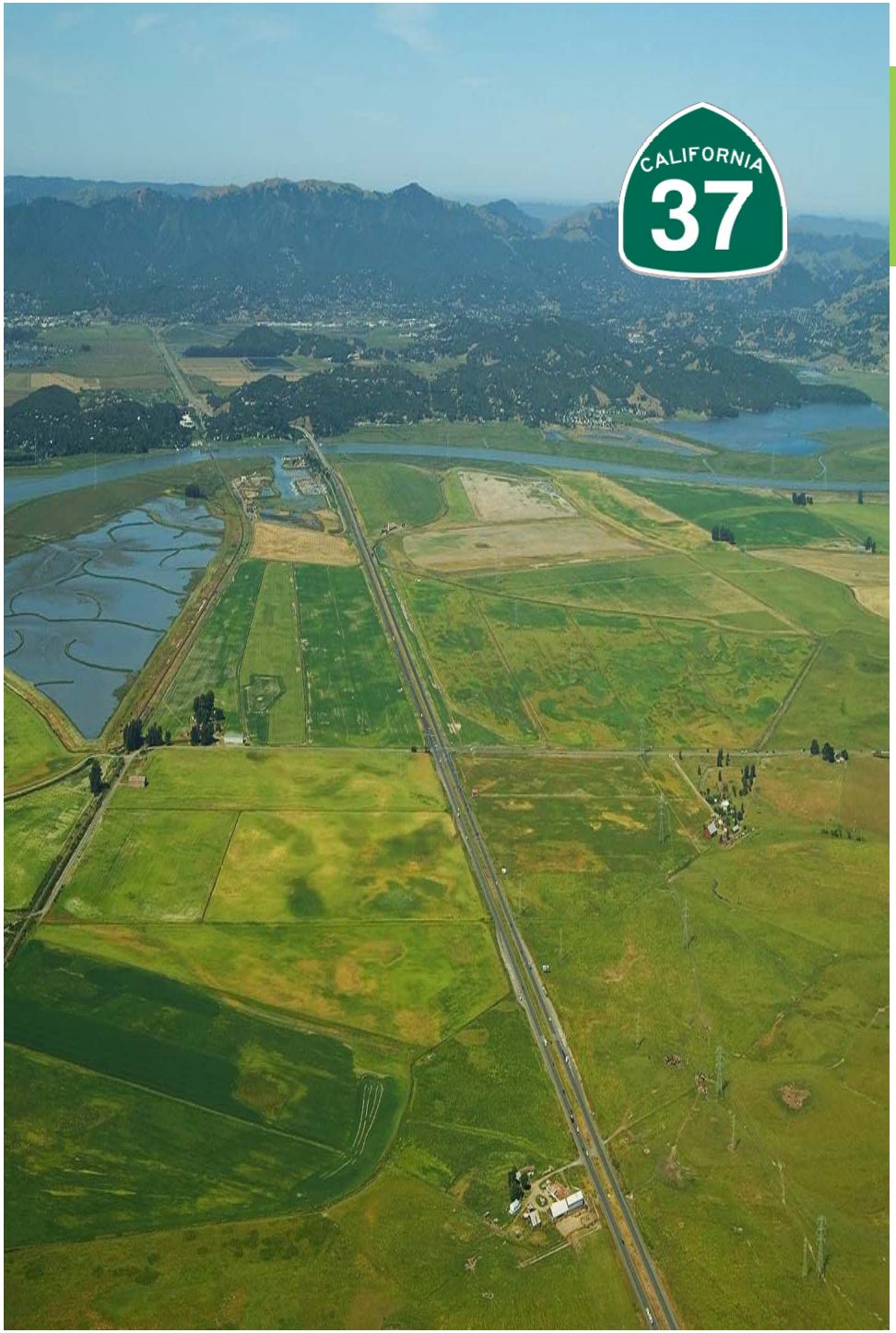
SR 37: AFFORDABILITY ANALYSIS & DECISION ROADMAP

PFAL

March 2, 2017

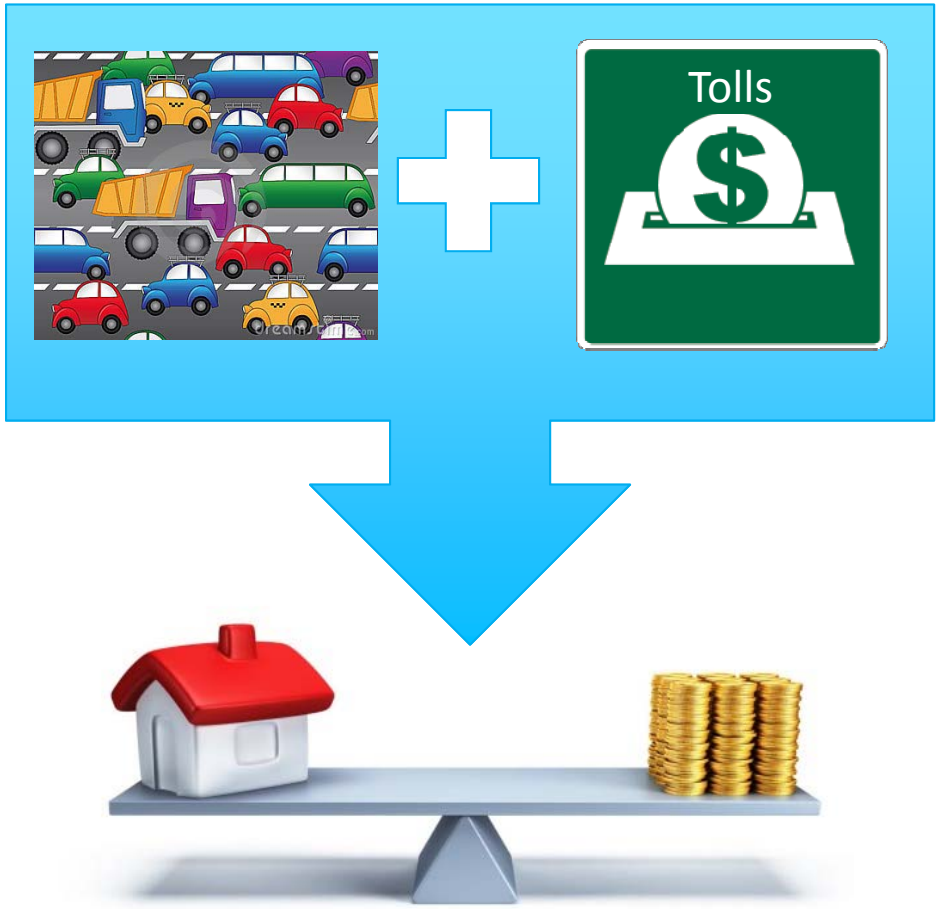


AGENDA

1. Introduction
2. Traffic & revenue analysis
3. Affordability analysis
4. Decision Roadmap
5. Q&A

1 INTRODUCTION

PROCESS OVERVIEW



Project Affordability

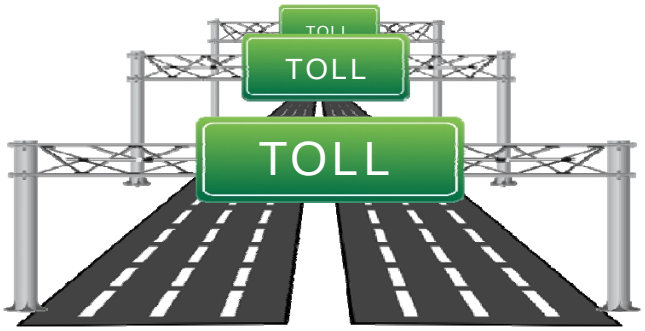
PROJECT OVERVIEW

Highway length 20.8 miles with segment lengths:

A= 7.1 miles, B= 9.3 miles, C= 4.4 miles

Source: UC Davis Study

TOLLING CONCEPTS



"Toll Road"

Three toll locations
Toll charge per mile travelled

Segment	Toll
A	$1.70
B	$2.25
C	$1.05
Total	$5.00

"Toll Bridge"

One toll location
Toll charge per "crossing"

Segment	Toll
A	-
B	$5.00
C	-
Total	$5.00

2 TRAFFIC & REVENUE

ANALYSIS FRAMEWORK

Analysis parameters:

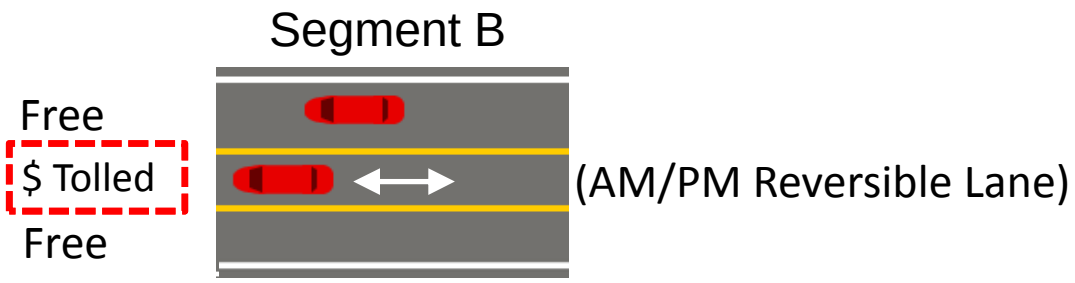
- Level One T&R assessment; preliminary sketch level analysis.
- Toll diversion assessment.
- Benchmarked to comparable California toll facilities.

PFAL team assumptions

- Tolls collected electronically with one gantry per segment (vehicle cost per mile and a flat charge at one location only).
- Discount for local Fastrak users.
- Trucks charged $20 per trip (Benchmark Bay Area: $15 - $35).

TRAFFIC CHARACTERISTICS

Users choice to pay tolls with alternative free lane

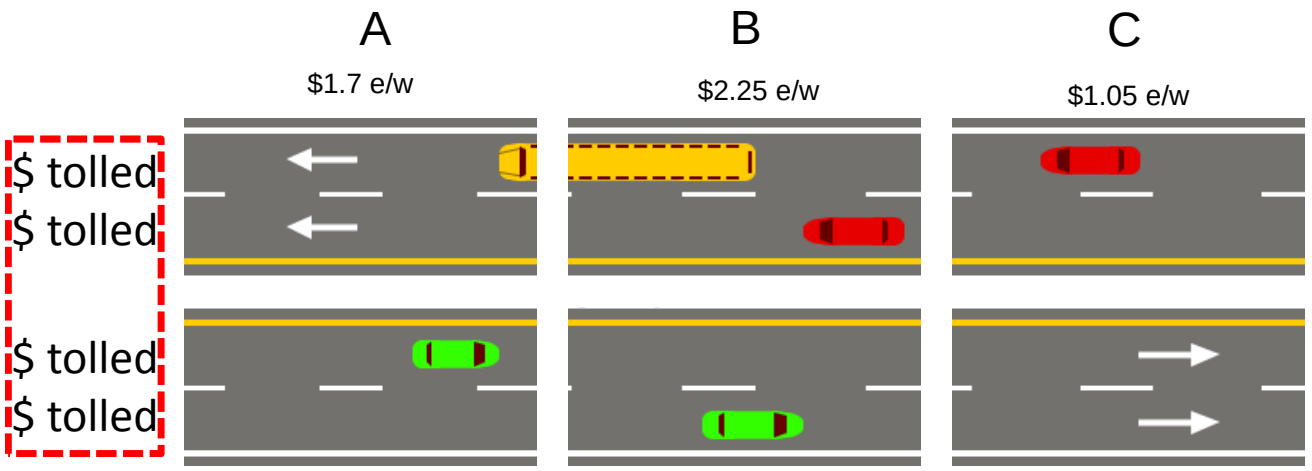


- Peak hour traffic 2,040* vehicles per hour (~15% of daily traffic)
- Capacity of single lane 1,800 vehicles per hour (LOS “C”)
- Approximately 12% of peak hour vehicles (or ~2% of daily traffic) would choose to pay a toll during peak hours.
- Outside peak hours users would choose free lane alternative given the traffic volumes are below the congested single lane capacity i.e. time savings gained would not be worth the toll charge.

* Estimated in year 2040. LOS means Level of Service.

TOLL REVENUE - $5 BOTH WAYS

Four lanes tolled, $5 each way



Vehicle colors do not represent different toll rate

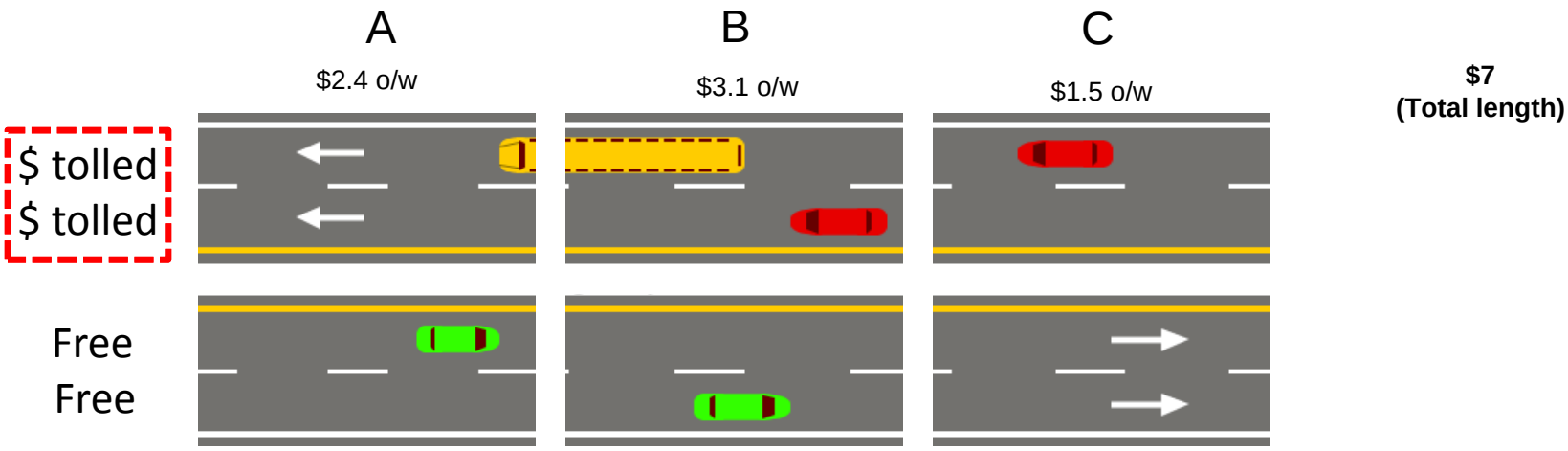
Tolling Options	A	B	C	Sum Total (over 50 years)*
Toll Road	$3.7 b	$5.3 b	$3.6 b	$12.5 b
Toll Bridge	-	$5 in Segment B only	-	$9.3 b

* Total revenue generated over 50 years of tolling. Toll rate escalated over this period.

e/w = each way; o/w = one way

TOLL REVENUE - $7 ONE WAY

Two lanes tolled, $7 one direction



Vehicle colors do not represent different toll rate

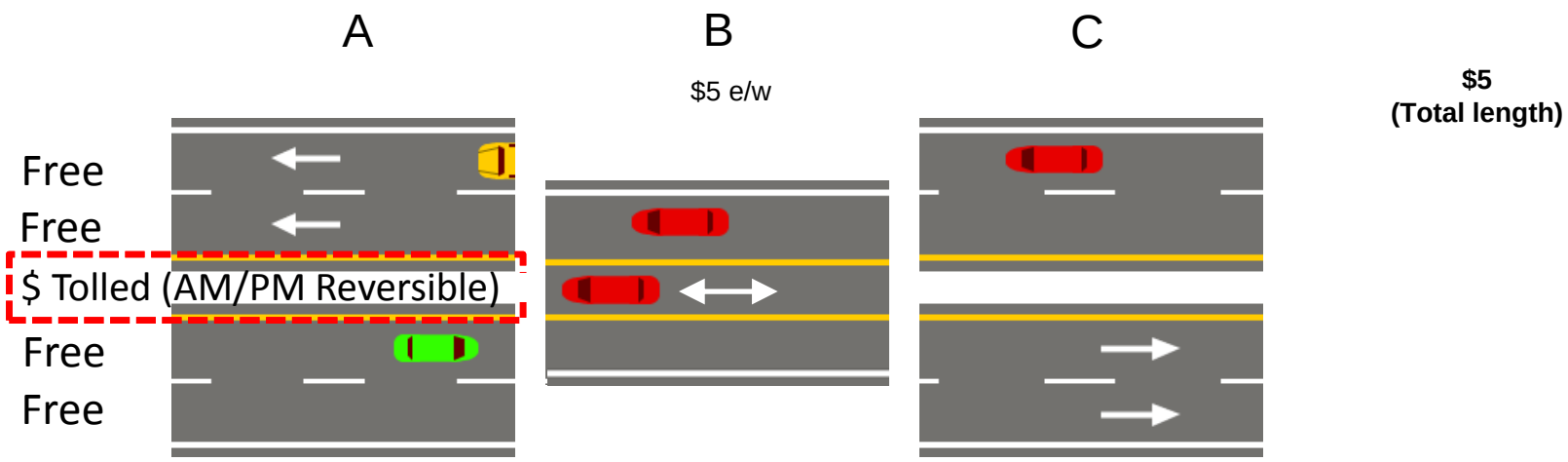
Tolling Options	A	B	C	Sum Total (over 50 years)*
Toll Road	$2.7 b	$3.9 b	$2.7 b	$9.4 b
Toll Bridge	-	$7 in Segment B only	-	$7.5 b

* Total revenue generated over 50 years of tolling. Toll rate escalated over this period.

e/w = each way; o/w = one way

TOLL REVENUE - $5 REVERSIBLE

One reversible lane tolled, $5 each way



Vehicle colors do not represent different toll rate

Tolling Options	A	B	C	Sum Total (over 50 years)*
Toll Road	N/A	N/A	N/A	N/A
Toll Bridge	$5 in Segment B only (Reversible toll: AM – westbound, PM – eastbound)			$0.3 b

* Total revenue generated over 50 years of tolling. Toll rate escalated over this period.

e/w = each way; o/w = one way

TOLL REVENUE SUMMARY

Toll revenue generation. Relative comparison for illustrative purposes.

Scenario	Toll Rate	Toll Option	Total Revenue
Four lanes tolled	$5 →	Toll Road (3 locations)	$12.5 b
		Toll Bridge (1 location)	$9.3 b
Two lanes tolled one direction	$7 →	Toll Road (3 locations)	$9.4 b
		Toll Bridge (1 location)	$7.5 b
One reversible lane tolled	$5 ⇆	Toll Bridge (1 location) AM – westbound PM - eastbound	$0.3 b

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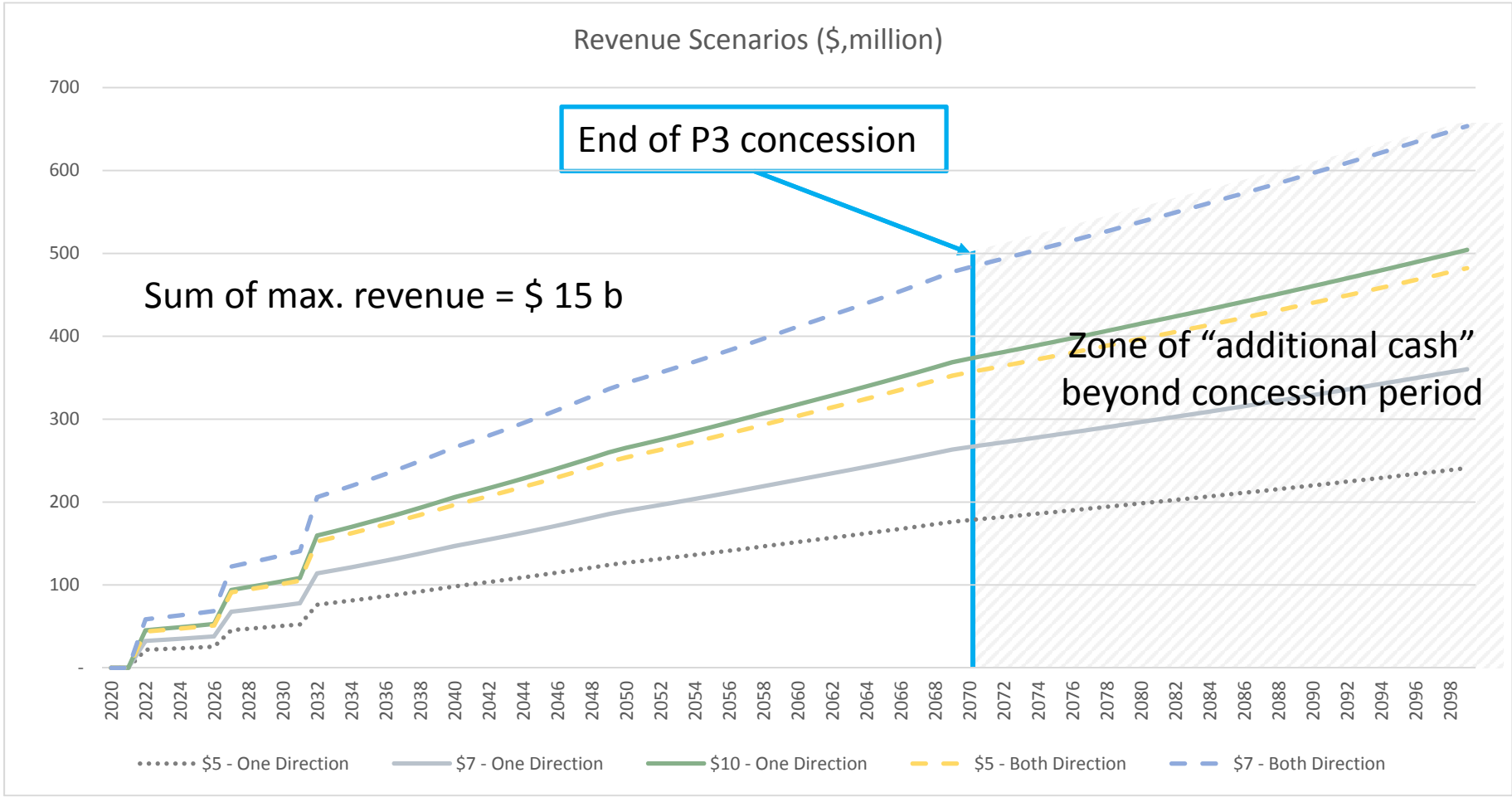
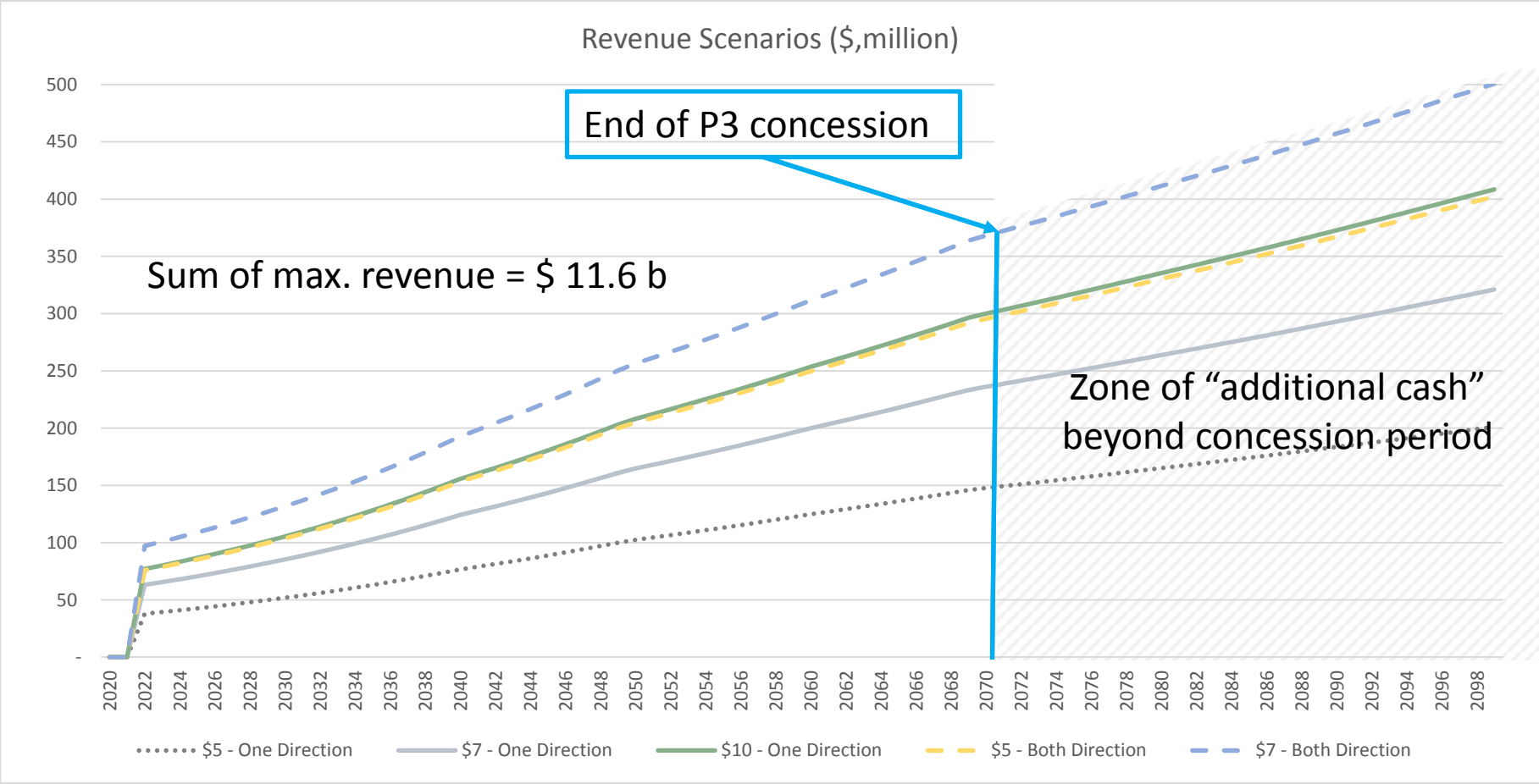
TRAFFIC & REVENUE – TOLLED IN EVERY SEGMENT (TOLL ROAD)



TRAFFIC & REVENUE – TOLLED IN SEGMENT B ONLY (TOLL BRIDGE)

Revenue generated is approximately 15-20% less than tolling in all Segments

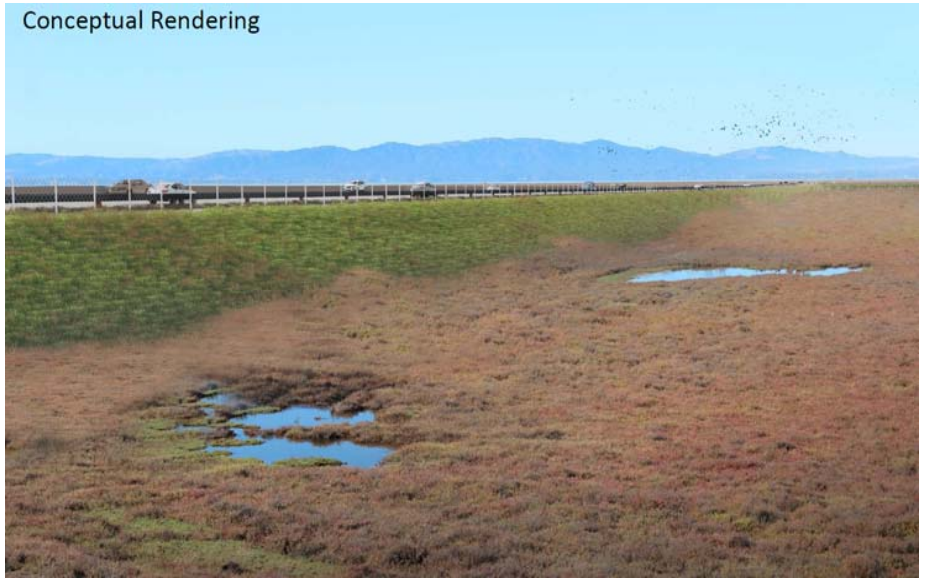


3 AFFORDABILITY ANALYSIS

TECHNICAL ALTERNATIVES

1. Levee/Embankment

Segment	Construction Cost in 2030	Construction Cost in 2022
A	$0.5 b	$0.4 b
B	$0.7 b	$0.5 b
C	$0.1 b	$0.1 b
Total	$1.3 b	$1.0 b



Source: UC Davis Study, 2016

TECHNICAL ALTERNATIVES

2. Slab Bridge Causeway

Segment	Construction Cost in 2030	Construction Cost in 2022
A	$1.3 b	$1.0 b
B	$2.2 b	$1.7 b
C	$0.3 b	$0.3 b
Total	$3.8 b	$3.0 b

Source: UC Davis Study, 2016

TECHNICAL ALTERNATIVES

3. Box Girder Causeway

Segment	Construction Cost in 2030	Construction Cost in 2022
A	$1.4 b	$1.1 b
B	$2.5 b	$2.0 b
C	$0.4 b	$0.3 b
Total	$4.3 b	$3.4 b

Source: UC Davis Study, 2016

DELIVERY OPTIONS

1. Traditional

- **Revenue:** non-tolled facility
- **Facility Ownership:** public
- **Contract:** traditional inter-agency agreements
- **Funding:** only public funds (local/state/fed grants)
- **Delivery Method:** Design-Bid-Build (DBB)

2. Public-private partnership (P3)

- **Revenue:** tolls, sales tax
- **Facility Ownership:** public
- **Contract:** long term lease with private partner (e.g. 30 to 50 years)
- **Funding:** mix of public funds (local/state/fed grants) and private funds (equity & debt)
- **Delivery Method:** Design-Build-Finance-Operate-Maintain (DBFOM), DBFM and DBF

3. Public-Public

- **Revenue:** tolls, sales tax
- **Facility Ownership:** public
- **Contract:** Cooperative Agreement e.g. Bay Area Toll Authority (BATA)
- **Funding:** publicly financed (e.g. revenue bonds), grants
- **Delivery Method:** DBB, DB

4. Privatization

- **Revenue:** tolls
- **Facility Ownership:** private
- **Contract:** Acquisition & Development Agreement
- **Funding:** 100% privately financed (equity & debt)
- **Delivery Method:** full private responsibility for asset

Goals/Objectives: Roles & Responsibilities

Determine "Best Value" approach via Value-for-Money Assessment

Industry/Market Feedback

MODEL ASSUMPTIONS

Project Costs	Low	Medium	High
Total Construction Costs* ($b)	$1.0	$3.0	$3.4
Total Operations & Maintenance Costs ($b)	$0.40	$0.40	$0.40
Total Lifecycle Costs ($b)	$0.34	$0.57	$0.60

Dates	
Construction Period (Per Segment)	3 years
Operation Period	50 years
Total Project Period	53 years

*Source: UC Davis Study, 2016. Note: construction costs provided in 2022 dollars

MODEL ASSUMPTIONS

Analyzed three project delivery and financing alternatives.

P3 Financing – Availability Payment	
Debt/Equity	85 / 15
Private Debt Pricing*	5.35%
Debt tenor	40 years
Equity return	12.0%

Case Studies:

- I-4 Ultimate, FL
- Presidio Parkway, CA

P3 Financing – Revenue Risk	
Debt/Equity	75 / 25
Private Debt Pricing*	6.20%
Debt tenor	40 years
Equity return	13.5%

Case Studies:

- South Bay Express, CA
- US 36, CO
- South Norfolk, VA

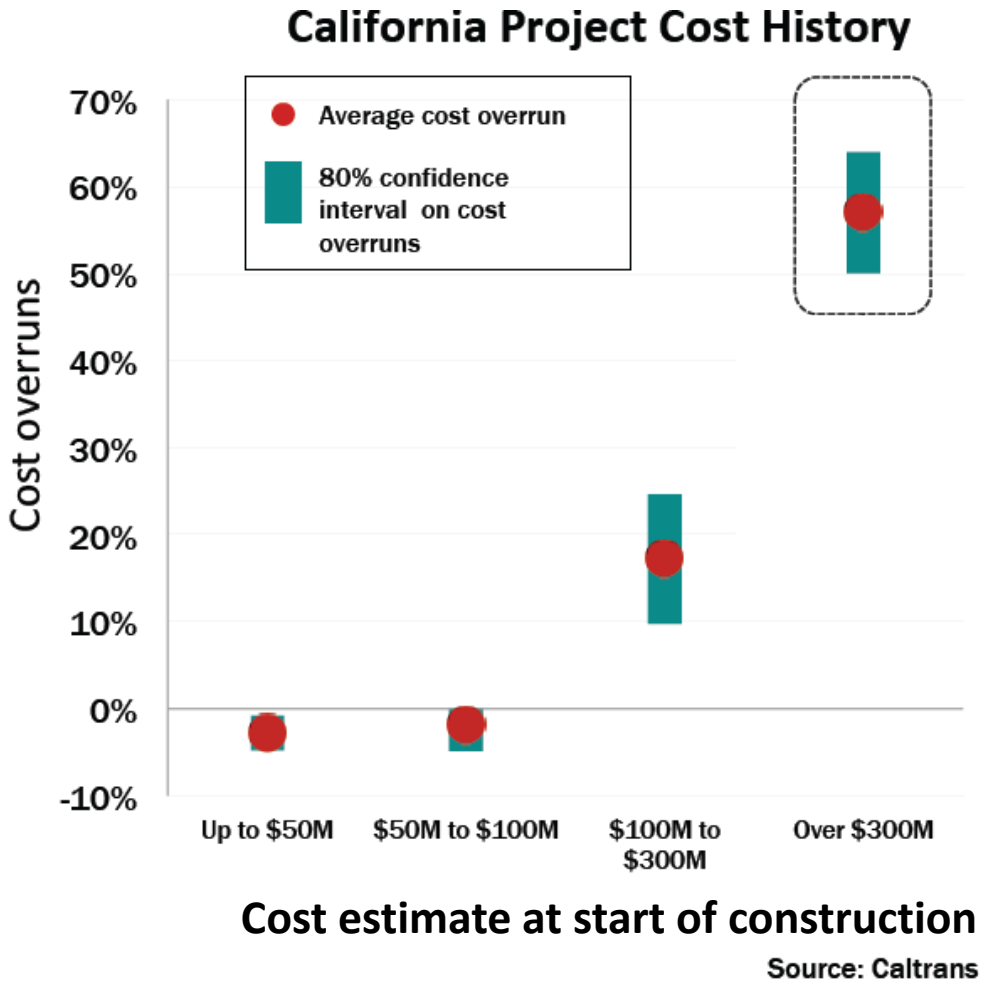
Financing – Public Finance**	
Debt/Equity	100 / 0
Public Debt Pricing*	3.90%
Debt tenor	40 years
Equity return	N/A

Case Studies:

- George Bush Turnpike, TX

**Base interest rates based on 30-year AAA MMD benchmark, Corporates Bonds benchmark, and Municipal Bonds Benchmark.*
***Design Bid Build (DBB) option includes 20% and 10% cost overrun adjustment for Construction and O&M costs, respectively*

PROJECT DELIVERY



For Caltrans projects with an initial budget of $300m or more, documented cost overruns are in the 60% range.

AFFORDABILITY ASSESSMENT – TOLLED IN EVERY SEGMENT

	Low CAPEX ($1.0 b)*					Medium CAPEX ($3.0 b)*					High CAPEX ($3.4 b)*				
	$5→	$7→	$10→	$5⇆	$7⇆	$5→	$7→	$10→	$5⇆	$7⇆	$5→	$7→	$10→	$5⇆	$7⇆
Segment A	✗	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
Segment B	✗	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
Segment C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗	✓	✓	✓	✓

Important Notes:

1. Check marks represent toll revenue in that segment is sufficient to fund the total cost of the segment under an availability payment P3 structure. Note; other delivery models may have less favorable results.
2. The reversible lane option revenue is insufficient across all options.
3. This affordability analysis relies on key inputs from third party sources. This third party information will need to be updated and reflected in any subsequently revised affordability analysis.
4. This affordability assessment includes O&M, full lifecycle and financing costs for years 1-50.
5. *Source: UC Davis Study, 2016. Note: construction costs for Segments A, B & C provided in 2022 dollars.

AFFORDABILITY ASSESSMENT – TOLLED IN SEGMENT B ONLY

	Low CAPEX ($0.5 b)*					Medium CAPEX ($1.7 b)*					High CAPEX ($2.0 b)*				
	$5→	$7→	$10→	$5⇆	$7⇆	$5→	$7→	$10→	$5⇆	$7⇆	$5→	$7→	$10→	$5⇆	$7⇆
Segment A	---------- Not applicable in this case, Segment B only----------														
Segment B	✓	✓	✓	✓	✓	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗
Segment C	---------- Not applicable in this case, Segment B only----------														

Important Notes:

1. Check marks represent toll revenue in that segment is sufficient to fund the total cost of the segment under an availability payment P3 structure. Note; other delivery models may have less favorable results.
2. The reversible lane option revenue is insufficient across all options.
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4. This affordability assessment includes O&M, full lifecycle and financing costs for years 1-50.
5. *Source: UC Davis Study, 2016. Note: construction costs for Segments A, B & C provided in 2022 dollars.

MINIMUM TOLL RATE NEEDED

Tolling Scenarios		Minimum Toll Rate Needed*	Construction Cost Affordability**
Toll Road	One Direction	$6 o/w	$1.0 b
	Both Directions	$3 e/w	$1.0 b
Toll Bridge	One Direction	$6 o/w	$1.0 b
	Both Directions	$3 e/w	$1.0 b
Toll Bridge (Segment B only)	One Direction	$4 o/w	$0.5 b
	Both Directions	$2 e/w	$0.5 b

* Toll rate is weighted; includes higher toll rates for visitors and truck traffic
** Construction costs from the UC Davis Study, 2016

e/w = each way; o/w = one way

Note: affordability assessment includes O&M, full lifecycle and financing costs for years 1-50
High level proxy for indicative purposes only. Further analysis required.

MAXIMUM REVENUES

Tolling Scenarios		Revenues (Years 1-50)	Additional Revenues (Years 51-80)	Approximate CAPEX * affordable with additional revenue
Toll Road	$5 →	$6.3 b	$4.0 b	$0.6 b
	$5 ⇆	$12.5 b	$9.9 b	$1.5 b
	$7 →	$9.4 b	$6.9 b	$0.3 b
	$7 ⇆	$16.9 b	$14.1 b	$2.1 b
	$10 →	$13.1 b	$10.5 b	$1.6 b
Toll Bridge	$5 →	$4.6 b	$3.2 b	$0.5 b
	$5 ⇆	$9.3 b	$8.1 b	$1.2 b
	$7 →	$7.5 b	$6.1 b	$0.9 b
	$7 ⇆	$11.6 b	$10.5 b	$1.6 b
	$10 →	$9.4 b	$8.2 b	$1.2 b
Max Toll Road	**$7 ⇆**	**c. $16.9 b**	**$14.1 b**	**$2.1 b**
Max Toll Bridge	**$7 ⇆**	**c. $11.6 b**	**$10.5 b**	**$1.6 b**

* Capital expenditure approximation coefficient derived from the availability payment delivery model.

MAXIMUM AFFORDABILITY

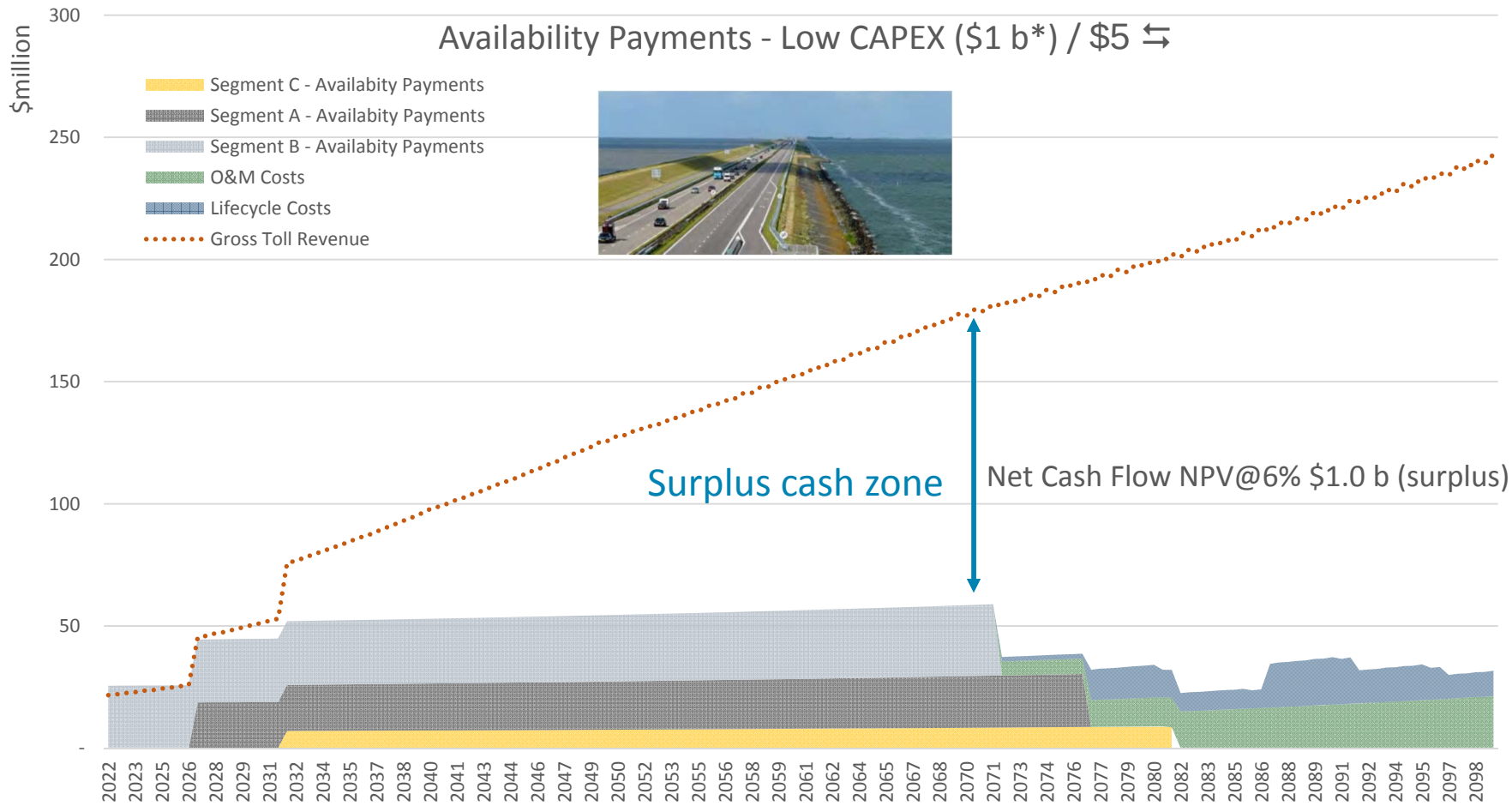
Tolling Scenarios		Max. Construction Cost Affordability*
Toll Road	$5 →	c. $0.8 b
	$5 ⇆	c. $1.9 b
	$7 →	c. $1.3 b
	$7 ⇆	c. $2.6 b
	$10 →	c. $2.0 b
Toll Bridge	$5 →	c. $0.7 b
	$5 ⇆	c. $1.5 b
	$7 →	c. $1.2 b
	$7 ⇆	c. $1.9 b
	$10 →	c. $1.5 b
Max Toll Road	**$7 ⇆**	**c. $2.6 b**
Max Toll Bridge	**$7 ⇆**	**c. $1.9 b**

* Construction cost affordability from revenue generated in years 1-50
** Construction costs from the UC Davis Study, 2016

Note: affordability assessment includes O&M, full lifecycle and financing costs for years 1-50

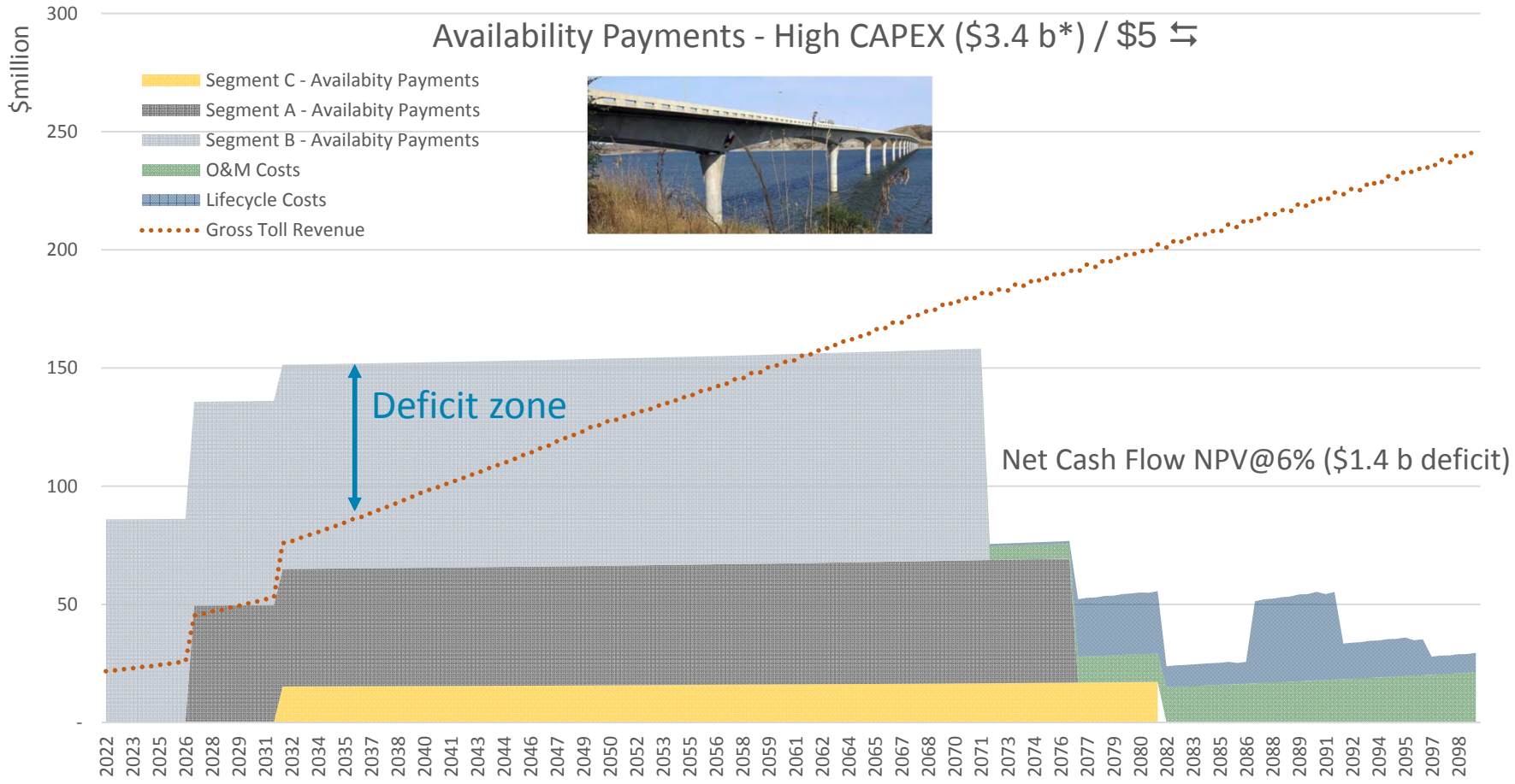
Technical Alternatives	Construction Cost in 2022**
1. Levee/Embankment	$1.0 b
2. Slab Bridge Causeway	$3.0 b
3. Box Girder Causeway	$3.4 b

P3: FULLY FUNDED PROGRAM



* Construction costs from the UC Davis Study, 2016.
NPV means Net Present Value.

P3: UNDERFUNDED PROGRAM

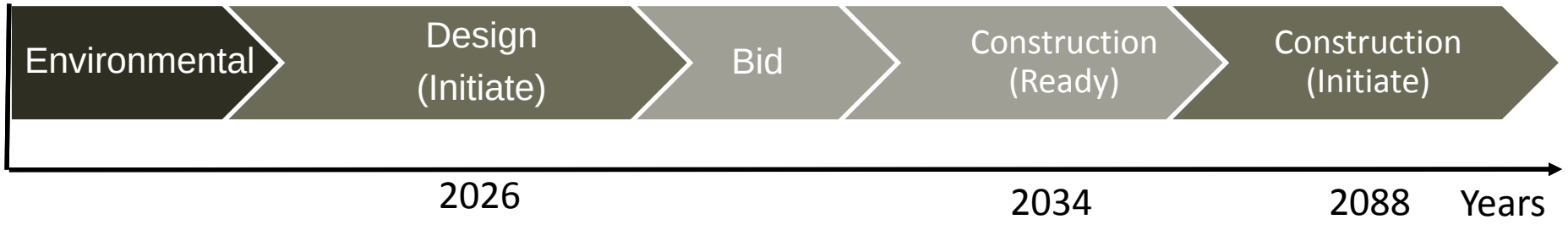


* Construction costs from the UC Davis Study, 2016.
NPV means Net Present Value.

TRADITIONAL ALTERNATIVE

Traditional funding approach with STIP/ITIP*:

- ❑ Design-bid-build delivery model
- ❑ $1 b construction cost (Segment B)
- ❑ $20 m environmental
- ❑ $90 m design
- ❑ $30 right-of-way
- ❑ Estimated start of construction 2088
- ❑ Delayed due to funding shortfall



* STIP/ITIP share for four North Bay Counties

CONCLUSIONS

Tolling at least 2 lanes is necessary in order to fund a viable project.

Tolling only Segment B can fund a $1.9 b project.

Toll rates and project size can vary to define a suitable project within the affordability envelope.

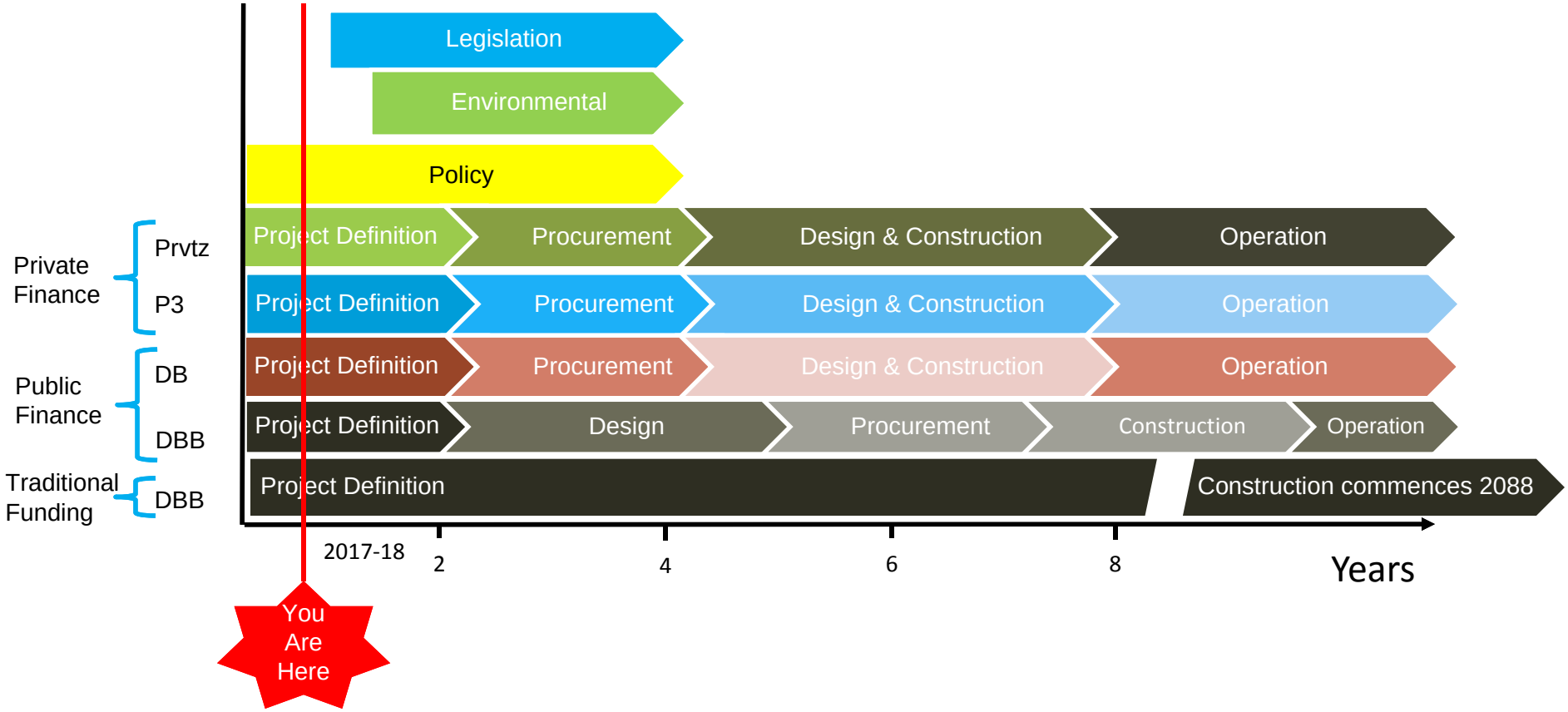
Will have to address increased traffic diversion rate to “free” alternatives.

Tolling only one lane (leaving one lane free) is not enough even to fund Technical Alternative 1 ($1.0 b).

Potential for “additional cash” beyond initial investment scope.

4 SR 37 DECISION ROADMAP

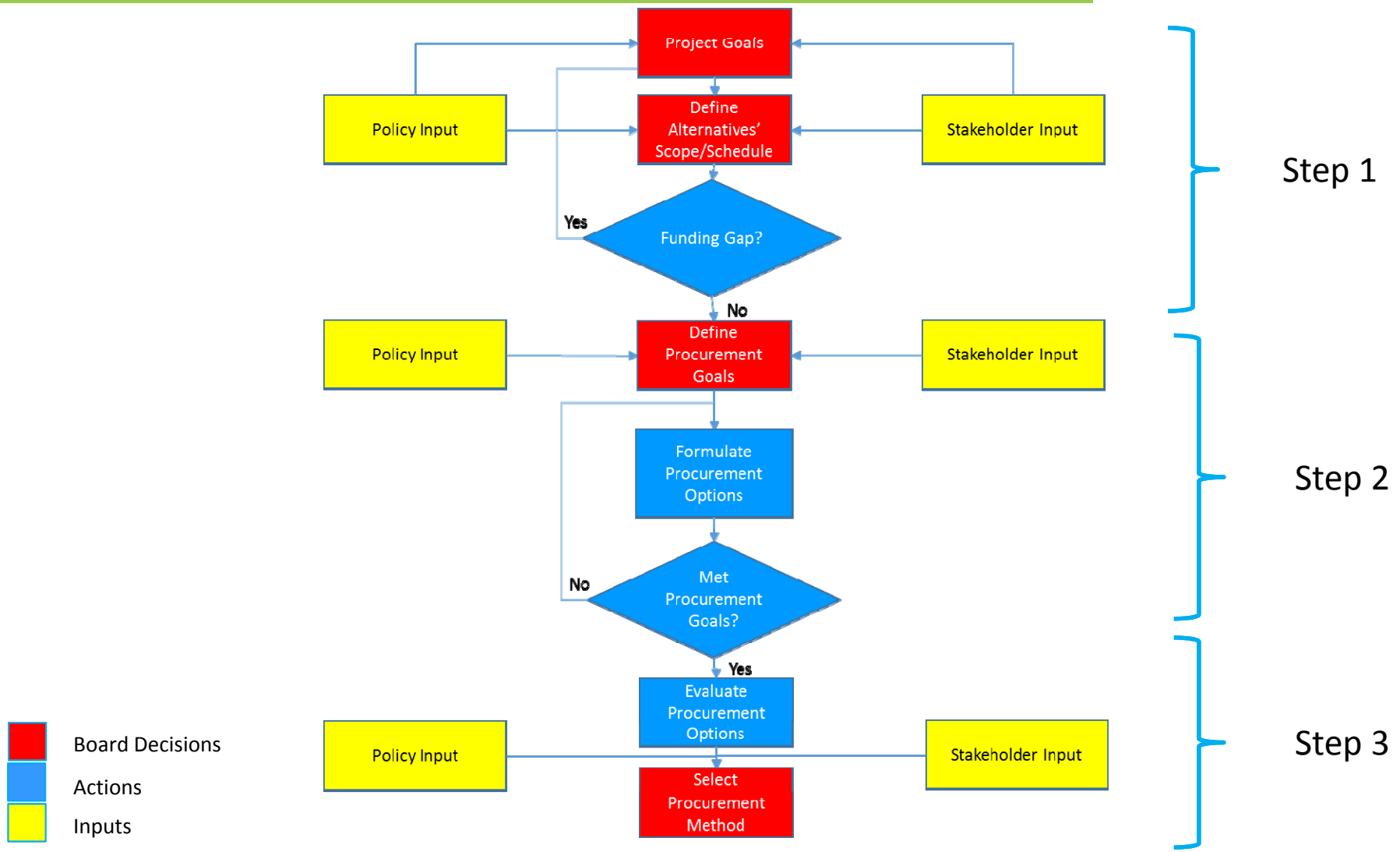
PROJECT DEVELOPMENT INDICATIVE TIMELINES



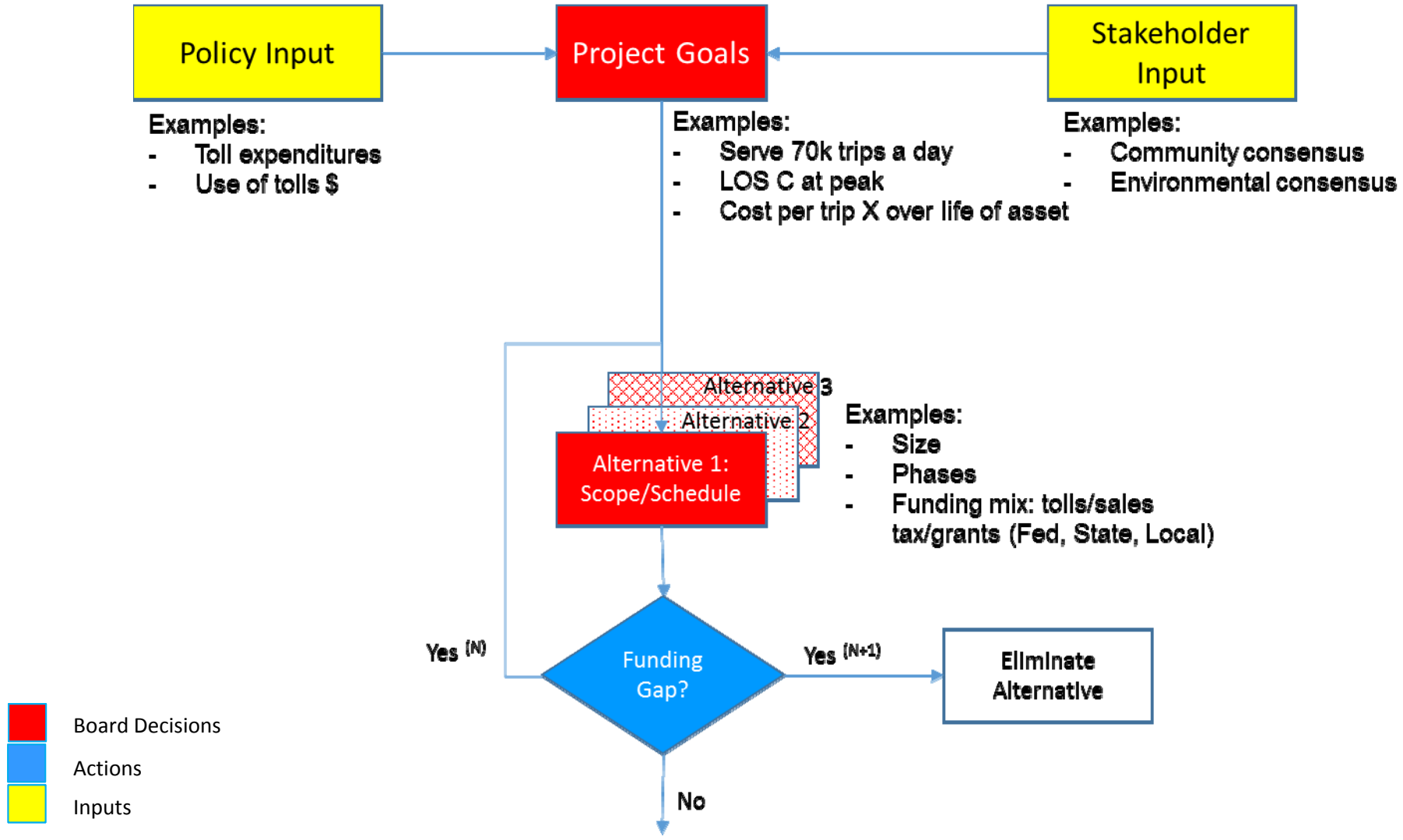
Delivery models: Prvtz = Privatization, P3 = Public Private Partnership, DB = Design Build, DBB = Design Bid Build

Private finance means private debt/equity e.g. developer/infrastructure funds, bank debt, private placement, PABs;
Public finance means municipal/federal debt e.g. revenue bonds, TIFIA loan;
Traditional funding means the highway is not tolled e.g. federal/state/local funding such as STIP/ITIP;

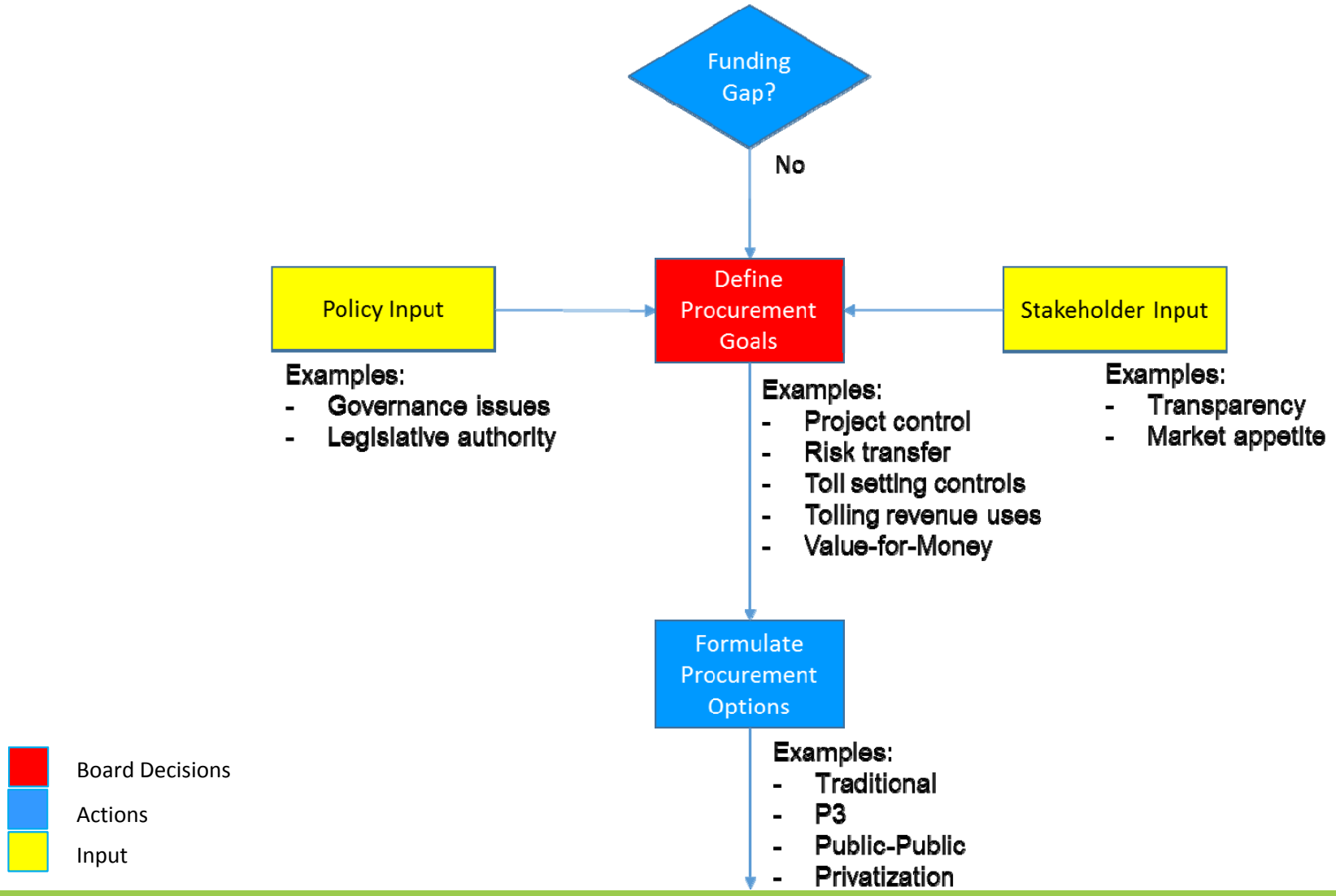
DECISION ROADMAP OVERVIEW



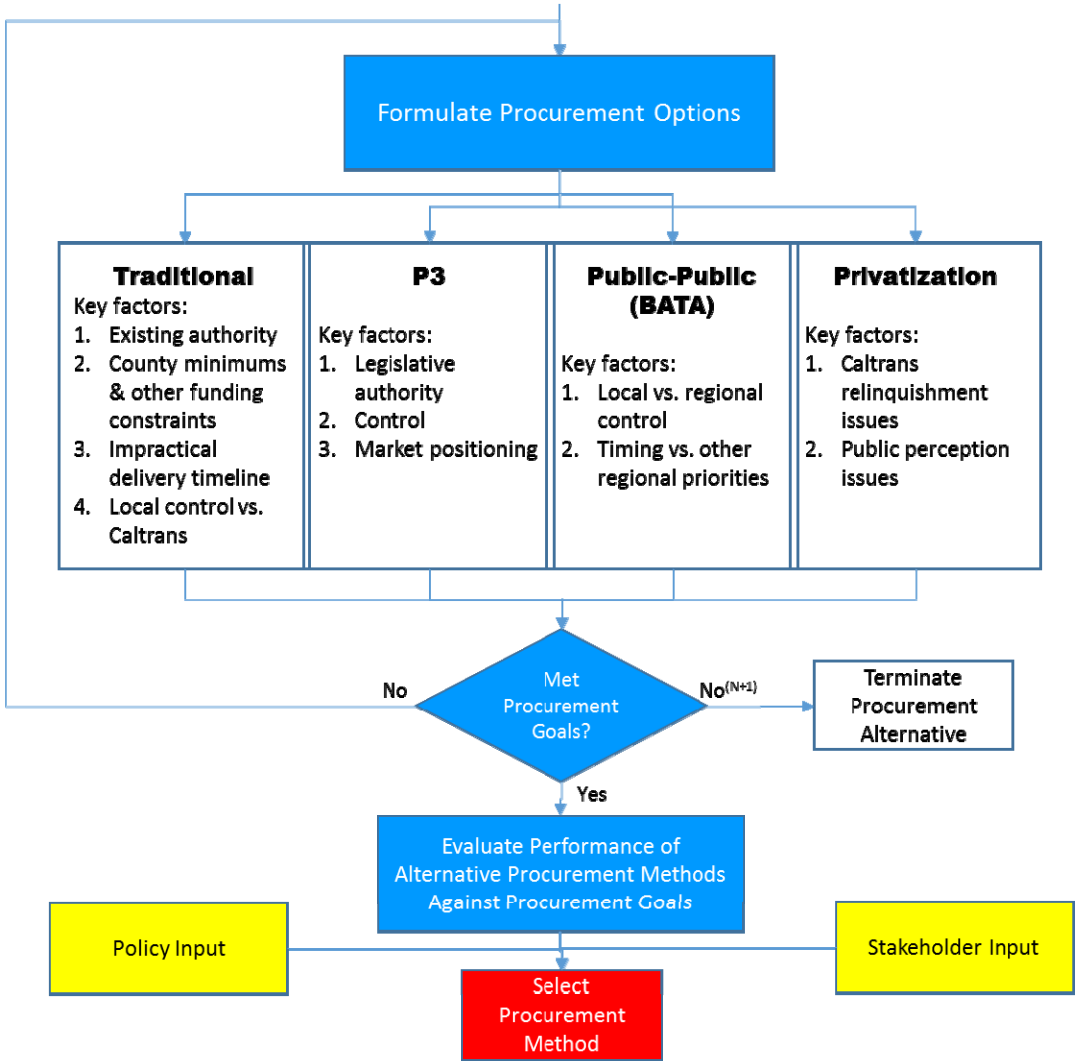
DECISION ROADMAP: STEP 1



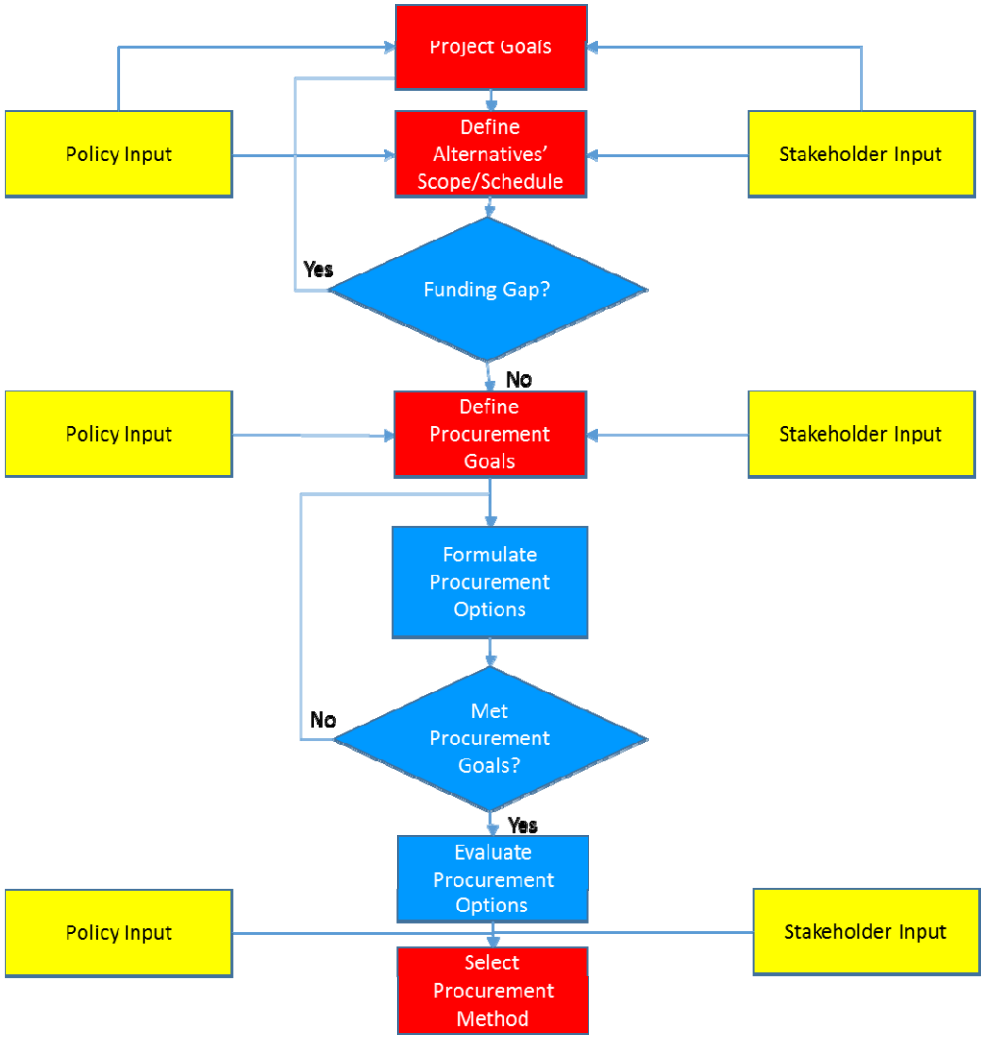
DECISION ROADMAP: STEP 2



DECISION ROADMAP: STEP 3



INDICATIVE TIMELINE



Step 1 — 6-12 months

Step 2 — 3-6 months

Step 3 — 3-6 months

Total 12-24 months

TYPICAL PROCUREMENT PROCESS

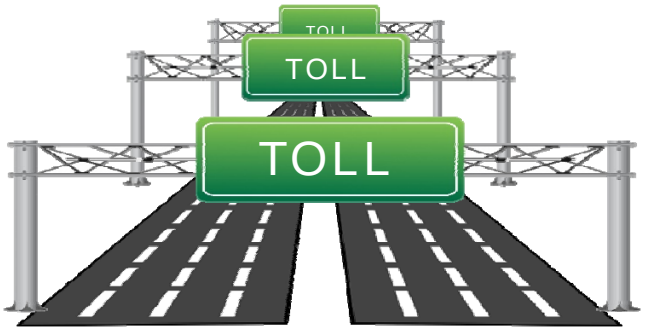
Once project(s) approved for procurement:

12–18 MONTHS

5 Q&A

PFAL

TOLLING CONCEPTS



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One toll location
Toll charge per "crossing"

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TOLL REVENUE SUMMARY

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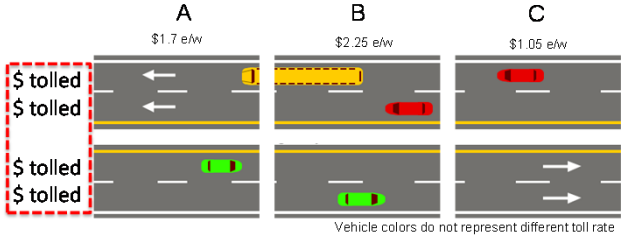

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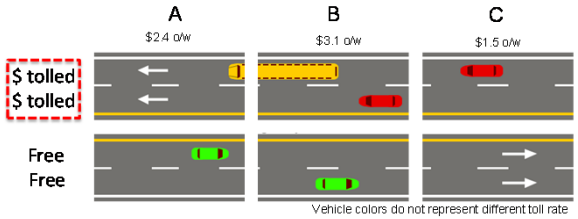
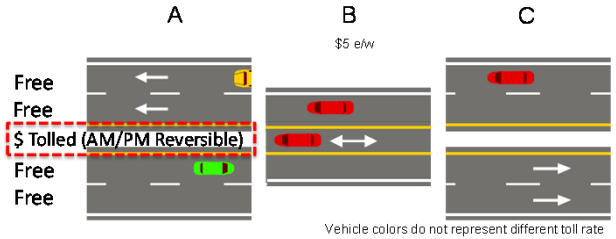
Toll Road	$3.7 b	$5.3 b	$3.6 b	**$12.5 b**
Toll Bridge	$5 in Segment B only			**$9.3 b**

2. Two lanes tolled, $7 one direction



A	B	C	Sum Total (over 50 Years)*
$2.7 b	$3.9 b	$2.7 b	**$9.4 b**
$7 in Segment B only			**$7.5 b**

3. One reversible lane tolled, $5 each way



A	B	C	Sum Total (over 50 Years)*
N/A	N/A	N/A	N/A
$5 in Segment B only Reversible toll: AM – westbound, PM – eastbound			**$0.3 b**

Scenario	Toll Rate	Toll Option	Total Revenue*
1. Four lanes tolled	$5 →	Toll Road (3 locations)	$12.5 b
		Toll Bridge (1 location)	$9.3 b
2. Two lanes tolled one direction	$7 →	Toll Road (3 locations)	$9.4 b
		Toll Bridge (1 location)	$7.5 b
3. One reversible lane tolled	$5 ⇆	Toll Bridge (1 location) AM – westbound PM - eastbound	$0.3 b

* Total revenue generated over 50 years of tolling. Toll rate escalated over this period.

Note: UC Davis Study, construction costs for technical alternatives include Levee/embankment at $1.0 b, Slab Bridge Causeway at $3.0 b and Box Girder Causeway at $3.4 b (all costs in 2022 dollars).

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