



Chapter 3. Essential Components' Needs Assessment

The analyses for the essential components (i.e., safety, traffic and regulatory elements) are quite different from those for the pavements. A regression equation developed in the 2008 study was used, and a case study approach applied to NPDES (National Pollutant Discharge Elimination System) costs.

3.1 Data Collection

A total of 296 survey responses were received compared to 188 in 2008. Agencies were asked to provide specific information on the inventory and replacement costs for the following twelve asset categories:

| Asset Category | Essential Components |
|----------------|---|
| 1 | Storm Drains |
| 2 | Curb and gutter |
| 3 | Sidewalk (public) |
| 4 | Curb ramps |
| 5 | Traffic signals |
| 6 | Street Lights |
| 7 | Sounds Walls/Retaining walls |
| 8 | Traffic signs |
| 9 | Other elements e.g. manholes, inlets, culverts, pump stations etc |
| 10 | NPDES (addressed through the case studies) |
| 11 | Other ADA compliance needs |
| 12 | Other physical assets or expenditures |

In the 2008 analysis, only the first eight categories were included because we had little or no data on the last four categories. In the 2010 update, significantly more data on the last four categories were received, so our approach was modified to address them. Essentially, we used the model from 2008 to determine the needs of the first eight categories, and then added the needs of the remaining four categories as a percentage.

3.2 Model Verification

The regression model developed in 2008 for the replacement cost of the **first eight categories** is:

$$\text{In Cost} = 17.9 + 0.00189 \text{ Total Miles} - 2.09 \text{ Type_Rural} + 0.682 \text{ Climate_Central}$$

As part of the calculations, we first wanted to verify that the model was still valid. Combining both the 2010 and 2008 survey results, a total of 305 agencies with less than 1,700 centerline miles of roads reported their essential component replacement costs. Table 3.1 is a comparison between the total reported replacement cost and the total calculated replacement cost from the model.





Table 3.1 Comparison Between Calculated and Actual Replacement Costs

| Reported Replacement Cost | Calculated Replacement Cost | Difference |
|---------------------------|-----------------------------|------------|
| \$52,059,717,782 | \$53,852,175,263 | 3.4% |

As can be seen, the difference is only about 3.4%, which validated the model for agencies with less than 1,700 centerline-miles.

However, 13 agencies with more 1,700 centerline miles also reported their replacement costs. The difference between their calculated and reported replacement costs was much larger and therefore, we concluded that the model was NOT valid when the network is more than 1,700 miles. This is not entirely surprising, since the model was developed with a much smaller dataset in 2008, and the agencies who responded had smaller networks— less than 1,700 miles.

There was only one agency with more than 1,700 miles that did not report their costs (Kern County, with 3,285 miles). Therefore, the replacement costs was estimated by using an average replacement cost per mile (\$7,295/mile) from two other similar agencies (Fresno County and Tulare County, both in the same vicinity and with the same mixed climate as Kern County).

Finally, there were a few agencies who reported huge replacement costs, up to \$1 billion/mile. Their costs were not used, and instead, the model was used to estimate their costs.

3.3 Determination of Essential Components' Needs

The regression model estimates the total replacement cost for only the first eight categories. To estimate the needs, this cost needs to be converted to an annual amount based on the estimated service life of the different non-pavement assets. This procedure was described in detail in Appendix D the 2008 report and has not been duplicated here.

Finally, the survey data submitted showed that the last four categories comprised 16.6 percent of the replacement costs of the first 8 categories. Therefore, 16.6 percent was added to the 10-year needs calculated from the model.

The needs for essential components is \$29.1 billion in 2010 (does not include NPDES).

The 10-year needs figure was estimated to be **\$29.1 billion**.

3.4 Impact of NPDES Regulations

In the 2008 study, very little information was received on the cost impacts of the NPDES permits. Anecdotally, however, many agencies believed that this had a significant cost impact on their transportation expenditures. Therefore, for the 2010 update, it was decided that a series of case studies should be performed to see if these impacts could be documented and quantified.





Table 3.1 Comparison Between Calculated and Actual Replacement Costs

| Reported Replacement Cost | Calculated Replacement Cost | Difference |
|---------------------------|-----------------------------|------------|
| \$52,059,717,782 | \$53,852,175,263 | 3.4% |

As can be seen, the difference is only about 3.4%, which validated the model for agencies with less than 1,700 centerline-miles.

However, 13 agencies with more 1,700 centerline miles also reported their replacement costs. The difference between their calculated and reported replacement costs was much larger and therefore, we concluded that the model was NOT valid when the network is more than 1,700 miles. This is not entirely surprising, since the model was developed with a much smaller dataset in 2008, and the agencies who responded had smaller networks— less than 1,700 miles.

There was only one agency with more than 1,700 miles that did not report their costs (Kern County, with 3,285 miles). Therefore, the replacement costs was estimated by using an average replacement cost per mile (\$7,295/mile) from two other similar agencies (Fresno County and Tulare County, both in the same vicinity and with the same mixed climate as Kern County).

Finally, there were a few agencies who reported huge replacement costs, up to \$1 billion/mile. Their costs were not used, and instead, the model was used to estimate their costs.

3.3 Determination of Essential Components' Needs

The regression model estimates the total replacement cost for only the first eight categories. To estimate the needs, this cost needs to be converted to an annual amount based on the estimated service life of the different non-pavement assets. This procedure was described in detail in Appendix D the 2008 report and has not been duplicated here.

Finally, the survey data submitted showed that the last four categories comprised 16.6 percent of the replacement costs of the first 8 categories. Therefore, 16.6 percent was added to the 10-year needs calculated from the model.

The needs for essential components is \$29.1 billion in 2010 (does not include NPDES).

The 10-year needs figure was estimated to be **\$29.1 billion**.

3.4 Impact of NPDES Regulations

In the 2008 study, very little information was received on the cost impacts of the NPDES permits. Anecdotally, however, many agencies believed that this had a significant cost impact on their transportation expenditures. Therefore, for the 2010 update, it was decided that a series of case studies should be performed to see if these impacts could be documented and quantified.





3.4.1 Background & Overview

As authorized by the Clean Water Act, the NPDES Permit Program controls water pollution by regulating sources that discharge pollutants into waters of the United States. The NPDES Program is responsible for significant improvements to our Nation's water quality. Under this program, all facilities which discharge **pollutants** from any **source** into **waters of the United States** are required to obtain a NPDES permit. In California, the NPDES Program is administered by the state.

Polluted stormwater runoff is commonly transported through Municipal Separate Storm Sewer Systems (MS4s), from which it is often discharged untreated into local water bodies. To help mitigate this problem, operators must obtain a NPDES permit and develop a stormwater management program. Dischargers are covered under Phase I or Phase II.

- **Phase I**, issued in 1990, requires *medium* and *large* cities or certain counties with populations of 100,000 or more to obtain NPDES permit coverage for their stormwater discharges (generally covered by individual permits).
- **Phase II**, issued in 1999, requires regulated small MS4s in urbanized areas, as well as small MS4s outside the urbanized areas that are designated by the permitting authority, to obtain NPDES permit coverage for their stormwater discharges (generally covered by a general permit).

Dischargers whose projects disturb one or more acres of soil or whose projects disturb less than one acre but are part of a larger common plan of development that in total disturbs one or more acres, are required to obtain coverage under the **General Permit for Discharges of Storm Water Associated with Construction Activity Construction General Permit Order 2009-0009-DWQ**. Construction activity subject to this permit includes clearing, grading, and disturbances to the ground such as stockpiling, or excavation, but does not include regular maintenance activities performed to restore the original line, grade, or capacity of the facility. The Construction General Permit requires the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP).

As part of this study, four case studies that included an urban and rural county, and a small and large city, were undertaken to determine the anticipated costs of the NPDES Program as it relates to transportation. The case studies were performed through an interview process with selected individuals from each jurisdiction and an examination of their financial records was conducted (where available). The four jurisdictions selected for this analysis included:

- Contra Costa County (urban county)
- El Dorado County – Tahoe Basin Portion Only (rural county)
- City of Encinitas (small city)
- City of San Jose (large city)

All four agencies represent a range of California Regional Water Boards, so that a representative sample of costs could be obtained. The case studies are presented below and include the location, population, NPDES permit coverage, transportation related tasks, and transportation related expenditures and expectations for each jurisdiction.





3.4.2 Contra Costa County

Location: Contra Costa County is a primarily suburban county in the San Francisco Bay Area. The County includes 19 incorporated cities and is 733 square miles in area.

Population: 1,051,677 as of January 1, 2008

NPDES Permits: The County is located within the jurisdiction of two Regional Water Quality Control Boards, each of which issues a separate MS4 NPDES Permit to the County. County projects are also subject to regulation by the State NPDES Construction General Permit.

- MS4 NPDES Permit (San Francisco Bay Regional Water Quality Board – Region 2) R2-2009-0074, NPDES Permit No. CAS612008 (Expires 2014)
- MS4 NPDES Permit (Central Valley Regional Water Quality Control Board – Region 5) R5-2010-0102 Permit No. CAS083313 (Expires 2015) – This permit was recently issued to bring it roughly into alignment with the Region 2 Permit (above) to provide coordination and prevent duplicative efforts.
- State NPDES Construction General Permit (CGP) No. 2009-009-DWQ, NPDES No. CAS000002 (Expires 2014)

NPDES transportation related tasks include:

- Street Sweeping
- Operations and Maintenance (including road maintenance, drainage facilities maintenance, sidewalk/plaza maintenance, catch basin inspections and maintenance, washing, graffiti removal, stormwater pump stations, and rural road construction)
- Permanent Drainage Facilities and BMPs (best management practices)
- Green Street Pilot Projects
- Low Impact Development (stormwater treatment to be implemented with harvest and use, infiltration and evapotranspiration, or bioretention)
- Capital Improvement Program (CIP) Project Construction Site Controls (Transportation Related)
- Storm Drain Inlet Markings
- Trash Capture Devices
- Litter Control
- Tracking and Reporting (Transportation Related)
State NPDES Construction General Permit (CGP) No. 2009-009-DWQ, NPDES No. CA S000002
- “SMARTS” System Reporting
- SWPPP/WPCP Compliance
- Construction Site Management
- Erosion Control and Stormwater Treatment Measures

NPDES Transportation Related Expenditures: Contra Costa County estimated their NPDES transportation related expenditures to total \$2.2 million for the 2009/2010 fiscal year. The County found it difficult to estimate expenditures because they do not have a NPDES tracking system or one specific budget dedicated to NPDES. This number is a rough estimate as expenditures occur across multiple departments and are not tracked specifically as NPDES expenditures in most cases. Another factor that complicates estimating costs is the fact that only certain projects are required to implement costly permanent stormwater treatment and flow control facilities. There can be a great deal of year-to-year variation in the number and magnitude of such projects undertaken by the County.





Future Expectations: Contra Costa County sees a general trend in their permit requirements towards more restrictive measures and increased costs. The County anticipates that for the remaining years of their current permits that the annual cost will increase by approximately 55 percent (\$1.2 million) over the 2009/2010 fiscal year for a total of approximately \$3.5 million per year for NPDES transportation related tasks.

3.4.3 El Dorado County (Tahoe Basin Portion)

Location: El Dorado County is a primarily rural county that ranges from the Lake Tahoe Basin through the Sierra foothills. This case study was conducted for the Lake Tahoe Basin portion of the County only. The Lake Tahoe Basin portion of the County includes one incorporated city (South Lake Tahoe) and is 219 square miles.

Population: approximately 34,327 as of January 1, 2008

NPDES Permits: The County is covered under the following NPDES permits:

- MS4 NPDES Permit (Lahontan Regional Water Quality Control Board – Region 6) R6T-2005-0026, NPDES Permit No. CAG616001 (Expired 2010 – Under permit until new permit is issued)
- NPDES General Construction Permit in the Lake Tahoe Hydrologic Unit (Lahontan Regional Water Quality Control Board – Region 6) R6T-2005-0007, NPDES Permit No. CAG616002 (Expired 2010 – Under permit until new permit is issued)

NPDES transportation related tasks include:

- Street Sweeping
- Operations and Maintenance
- CIP Projects/Environmental Improvement Program (EIP) Projects (erosion control measures and stormwater infiltration facilities)
- Stormwater Facilities Inventory
- Storm Drain Stenciling Program
- Inspections
- Monitoring
- Pollutant Load Reduction Strategy Development
- Tracking and Reporting (Transportation Related)
- SWPPP/WPCP Compliance
- Construction Site Management
- Erosion Control and Stormwater Treatment Measures

NPDES Transportation Related Expenditures: El Dorado County (Tahoe Basin Portion) estimated their NPDES transportation related expenditures to total \$5.8 million for the 2009/2010 fiscal year. It is worth noting that the County is a unique case study as it covers a relatively small, rural area but includes some strict and unique permit requirements. The County found it difficult to estimate expenditures because they do not have a NPDES tracking system or one specific budget dedicated to NPDES. This number is a rough estimate as expenditures occur across multiple departments and are not tracked specifically as NPDES expenditures in most cases. This number includes the total costs of all transportation related EIP projects.





Future Expectations: The County sees a general trend in their permit requirements towards more restrictive measures and increased costs. The County anticipates that for the future permit term the annual cost will increase by 10 to 25 percent, but for the purposes of this effort, the County estimated the increase to be approximately 15 percent (\$0.9 million) over the 2009/2010 fiscal year for a total of approximately \$6.7 million per year for NPDES transportation related tasks. As more EIP projects are implemented, this number could be affected. This is a difficult number to estimate, as the new permit has yet to be issued. This number is based on the expected permit conditions based on conversations between the Lahontan Regional Water Quality Control Board and the County.

3.3.4 City of Encinitas

Location: The City of Encinitas is a small coastal beach city located along six miles of Pacific coastline in northern San Diego County. The City is 19.4 square miles.

Population: 64,145 as of January 1, 2009

NPDES Permits:

The City is covered under the following NPDES permits:

- MS4 NPDES Permit (San Diego Regional Water Quality Control Board – Region 9) R9-2007-0001, NPDES Permit No. CAS0108758 (Expires 2012)
- State NPDES Construction General Permit (CGP) No. 2009-009-DWQ, NPDES No. CAS000002 (Expires 2014)

NPDES transportation related tasks include:

- Development Planning (including City of Encinitas Stormwater Manual, San Diego Region Hydromodification Management Plan, and Treatment Control BMP Inventory Management Program)
- Operations and Maintenance (including inspections, verifications, and maintenance)
- Construction (including construction site inventory and prioritization, BMPs for Construction Activities, and inspections)
- Illicit Discharge Detection and Elimination (including inspections and monitoring)
- Municipal (including Jurisdictional Urban Runoff Management Program (JURUMP), street sweeping, and MS4 facilities [catch basins, storm drain inlets, open channels, etc.])
- Capital Improvement Program (CIP) Project Construction Site Controls (Transportation Related)
- Tracking and Reporting (Transportation Related)
- “SMARTS” System Reporting
- SWPPP/WPCP Compliance
- Construction Site Management
- Erosion Control and Stormwater Treatment Measures

NPDES Transportation Related Expenditures: The City of Encinitas roughly estimated their NPDES transportation related expenditures to total \$1.7 million for the 2009/2010 fiscal year. The City found it difficult to estimate and quantify expenditures due to NPDES requirements affecting nearly all departments, functions, resources, and programs. The San Diego region has started a concerted effort to standardize fiscal assessments to better capture all costs related to stormwater mandates. As such, it is conceivable that as stormwater programs continue to evolve, it will be easier to define expenditures.





Future Expectations: The City anticipates costs related to NPDES transportation related tasks to increase in the future based upon the perpetual evolution of the regulatory dynamic that mandates measures that are more restrictive. The City anticipates that for the remaining years of their current permit that the annual cost will increase by approximately 10 percent (\$0.17 million) over the 2009/2010 fiscal year for a total of approximately \$1.9 million per year for NPDES transportation related tasks.

3.4.5 City of San Jose

Location: The City of San Jose is the largest city in the San Francisco Bay Area, located roughly 50 miles south of San Francisco in Santa Clara County. The City covers 178 square miles.

Population: 1,023,000 as of January 1, 2010

NPDES Permit:

The City is covered under the following NPDES permits:

- MS4 NPDES Permit (San Francisco Bay Regional Water Quality Board – Region 2) R2-2009-0074, NPDES Permit No. CAS612008 (Expires 2014)
- State NPDES Construction General Permit (CGP) No. 2009-009-DWQ, NPDES No. CAS000002 (Expires 2014)

NPDES transportation related tasks include:

- Street Sweeping
- Operations and Maintenance (including road maintenance, drainage facilities maintenance, sidewalk/plaza maintenance, catch basin inspections and maintenance, washing, graffiti removal, stormwater pump stations, and rural road construction)
- Permanent Drainage Facilities and BMPs
- Green Street Pilot Projects
- Low Impact Development (stormwater treatment to be implemented with harvest and use, infiltration and evapotranspiration, or bioretention)
- Capital Improvement Program (CIP) Project Construction Site Controls (Transportation Related)
- Storm Drain Inlet Markings
- Trash Capture Devices
- Litter Control
- Tracking and Reporting (Transportation Related)
- "SMARTS" System Reporting
- SWPPP/WPCP Compliance
- Construction Site Management
- Erosion Control and Stormwater Treatment Measures

NPDES Transportation Related Expenditures: The City of San Jose estimated their NPDES transportation related expenditures to total \$13.4 million for the 2009/2010 fiscal year. The City found it difficult to estimate expenditures because they do not have a NPDES tracking system or a specific budget dedicated to NPDES. This number is a rough estimate as expenditures occur across multiple departments and are not tracked specifically as NPDES expenditures in most cases.





Future Expectations: The City sees a general trend in their permit requirements towards more restrictive measures and increased costs. The City anticipates that for the remaining years of their current permits that the annual cost will increase by approximately 10 percent (\$1.3 million) over the 2009/2010 fiscal year for a total of approximately \$14.8 million per year for NPDES transportation related tasks.

3.4.6 Conclusions

The NPDES program is an excellent example of a regulatory requirement that is not funded. Because of new and evolving criteria, it is also difficult for cities and counties to estimate future needs with any degree of accuracy.

Therefore, the information presented in the above case studies is anecdotal in nature for a number of reasons:

- Expenditures are difficult to estimate due to lack of detailed and consistent tracking of NPDES expenditures across multiple departments, functions, resources, and programs. Estimates were made based on the best available information.
- Future expectations (and therefore expenditures) are difficult to estimate due to unforeseen future permit conditions, constantly changing requirements, and TMDL implementation.
- Permit conditions and requirements vary greatly between jurisdictions which make direct comparisons difficult.

Although this information includes rough estimates, it still lends itself to making general conclusions about transportation related NPDES expenditures. Table 3.2 compares the estimates provided by each jurisdiction for transportation related NPDES expenditures for fiscal year 2009/2010.

Table 3.2 – NPDES Case Study Summary (FY 2009/2010)

| Jurisdiction | Contra Costa County | El Dorado County (Tahoe Basin) | City of Encinitas | City of San Jose |
|--|---------------------|--------------------------------|-------------------|------------------|
| NPDES Expenditures (\$ M) | \$ 2.24 | \$ 5.82 | \$ 1.70 | \$ 13.41 |
| Anticipated Future Increase (\$ M/year) | \$ 1.23 | \$ 0.87 | \$ 0.17 | \$ 1.34 |

Assumptions/Notes:

- * Difficult to estimate due to lack of detailed and consistent tracking across all departments, functions, resources, and programs
- * The above numbers are estimates based on the best available information
- * Transportation Expenditures includes Capital Improvement Program Expenditures
- * Huge variability between the permit conditions and requirements for each jurisdiction
- * El Dorado County (Tahoe Basin) is a unique case study as it is for a relatively small area but includes some strict/unique requirements

Based on the case studies, the following conclusions may be made:

- Transportation related NPDES costs (as well as NPDES costs in general) are anticipated to increase in the future due to the perpetual evolution of the regulatory dynamic that mandates measures that are more restrictive. Costs are anticipated to increase between 10 percent and 55 percent. This increase varies greatly due to the size and type of the





jurisdiction, the permit(s) that covers the jurisdiction, and unknown future permit and TMDL requirements.

- Improved tracking of NPDES expenditures needs to take place in order to better estimate actual expenditures. Each of the jurisdictions are working on systems to better track NPDES expenditures in a consistent and accurate manner, but most are still a few years out in this effort.
- There is a large range in costs, from a low of 2 percent to a high of 55 percent. Much of the variability is probably due to differences in how costs are collected, as well as the different permit requirements and the existing practices of condition of the agencies.

Because of the large variability in costs, it was not possible to extrapolate any of these results statewide. However, it seems clear that there is a significant impact on transportation costs. Therefore, we recommend that future updates include a more intensive study of NPDES impacts.

