Appendix B. KCI Technologies 2009 Storm Drain Inventory and Inspection Project Summary Report.

DELDOT AGREEMENT 1354

STATEWIDE MS4 / BMP INVENTORY & INSPECTION

2009 ANNUAL REPORT

The following is a summary of work performed by KCI Technologies, Inc. (KCI) and Century Engineering, Inc. (CEI) from January 1 to December 31, 2009 on the Delaware Department of Transportation's (DelDOT) Agreement 1354. Notice to Proceed for this 5-year open-end contract was granted on December 20, 2006.

A. PROJECT MANAGEMENT

In 2009, KCI conducted seven project status meetings, nine internal field staff meetings, one internal database staff meeting, and eight miscellaneous meetings. KCI submitted to DelDOT a *2008 Agreement 1354 Annual Report* and a *2008 Annual BMP Inventory & Inspection Report*, as well as several Memorandums related to the Agreement.

1. Project Status Meetings

Seven project status meeting were held with DelDOT, KCI, and CEI to discuss work completed and outstanding issues **(Table 1)**. KCI distributed an agenda at least two days prior to each meeting and prepared meeting minutes for each meeting within 48 hours, which included an Action Item List highlighting necessary actions, responsible parties, and target completion dates. These meetings have been highly effective in coordinating with DelDOT, identifying potential issues, and resolving issues in a timely manner.

2. Internal Staff Meetings

KCI conducted nine internal field staff meetings to discuss scheduling and to identify data collection issues **(Table 1)**. The purpose of the internal meetings was to provide an opportunity for field crews to share their experiences with other field crews and to develop the most efficient and consistent inspection methodology. An additional internal meeting was held with KCI's Technology Services staff to develop a completion schedule for the NPDES Map Viewer according to DelDOT's latest comments.

3. Miscellaneous Meetings

Eight additional meetings were held to discuss specific issues related to the project **(Table 1)**. The purpose of six of the meetings was to meet with DelDOT in regards to annual BMP inspections and BMP maintenance requirements. One meeting was held on February 23, 2009 with DelDOT North District Maintenance staff to discuss MS4 Maintenance Word Orders (MWOs) collected to-date by KCI and to elicit comment from the District on the proper MWO ratings prior to KCI's submission to DelDOT's MAXIMO MWO system. On August 27, 2009 KCI Technology Services staff met with DelDOT Information Technology (IT) staff to discuss the future submission of ownership of the database to DelDOT.

Table 1 summarizes all project-related coordination meetings in 2009.

TABLE 1
AGREEMENT 1354
COORDINATION MEETINGS

PROJECT STATUS	INTERNAL		MISCELLANEOUS	
	Field Staff	Database Staff		
01-15-09 (#24)	01-28-09	10-28-09	DelDOT/DNREC BMP	01-23-09
03-05-09 (#25)	02-25-09		DelDOT MS4 MWO	02-23-09
04-09-09 (#26)	05-13-09		DelDOT BMP #4	02-23-09
05-04-09 (#27)	06-04-09		DelDOT BMP #5	03-10-09
09-03-09 (#28)	07-08-09		DelDOT BMP Field	04-29-09
10-23-09 (#29)	09-03-09		DelDOT Database	08-27-09
12-09-09 (#30)	10-14-09		DelDOT BMP Field	09-02-09
	10-28-09		DelDOT BMP #6	12-16-09
	11-04-09			

4. Deliverables

Table 2 lists the deliverables transmitted in 2009.

TABLE 2
AGREEMENT 1354
DELIVERABLES

DATE	DELIVERABLE
11/19/08	NCCo Prioritized Contractor Repair Work Memo
01/23/09	Draft 2008 Annual BMP Report
03/02/09	Revisions to the 2009 BMP Record Memorandum
03/05/09	Work Order PowerPoint Files for North and Canal Districts
03/10/09	Work Order PowerPoint Files for Central and South Districts
03/20/09	Final 2008 Annual BMP Report
11/23/09	2010 DSF Maintenance Recommendations

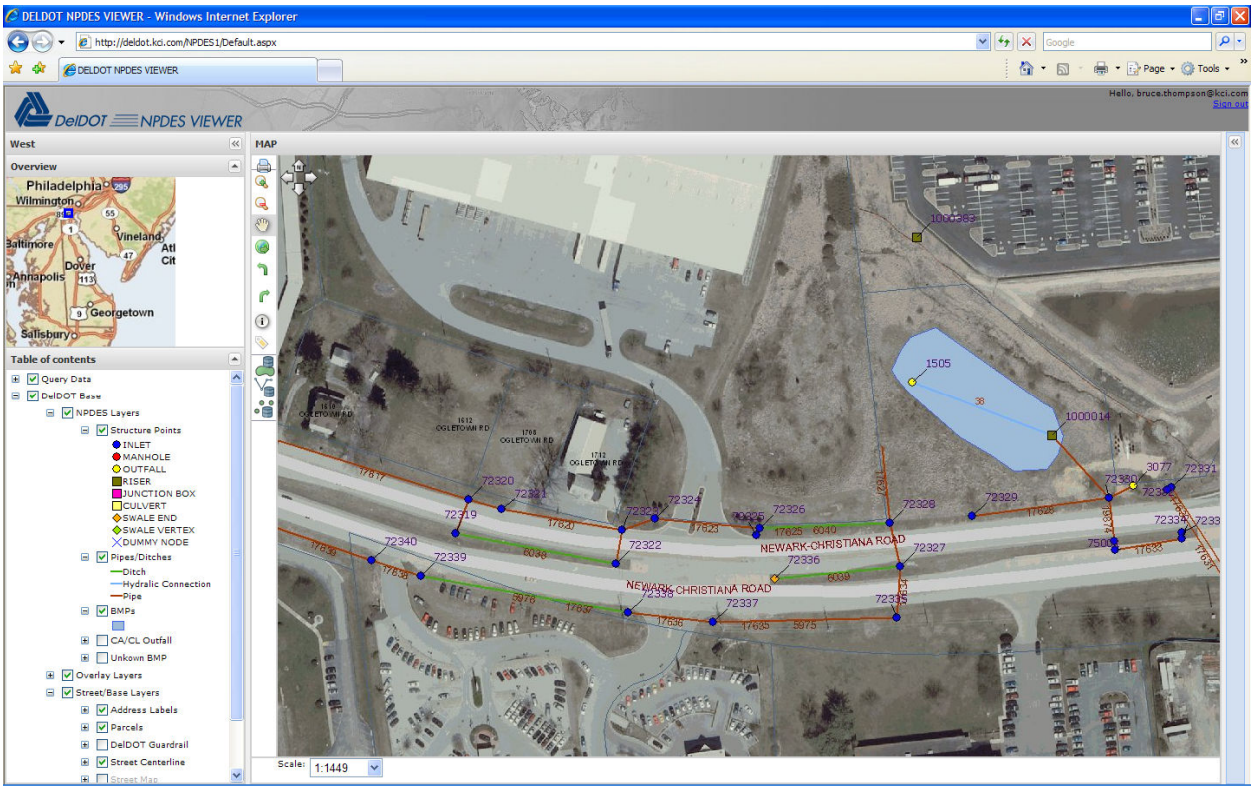
B. DATABASE MANAGEMENT

In 2007, KCI's Technology Services division developed a field application using advanced hardware, redesigned the existing Database structure to allow for re-inspections, migrated all existing data into the new Database design, and began development of a new field application to fit the new Database design.

In 2008, KCI's Technology Services division completed the development of the Field Application, Version 2 and developed a Web-based Map Viewer to replace and upgrade DelDOT's existing Map Viewer.

In 2009, DelDOT expressed a desire for KCI to simplify the Map Viewer, especially the querying capabilities. In 2009, KCI was 60% complete with the refinements to the Map Viewer to allow for more simplified querying. It is expected that the Map Viewer will be complete and submitted to DelDOT in 2010.

In December 2009, KCI submitted over 500 MWO to DelDOT for input into their MAXIMO MWO system using the NPDES database to rate and edit MWOs according to the protocol set forth during the meeting with North District Maintenance staff on February 23, 2009. These MWOs were from MS4 inspection work begun in June 2007. It is anticipated that in 2010, MWOs will be submitted to DelDOT every 1-2 months.



DelDOT NPDES Map Viewer

C. BEST MANAGEMENT PRACTICE (BMP) INVENTORY AND INSPECTION

In early 2009, KCI submitted a *2008 Annual BMP Inventory & Inspection Report*. In Fall 2009, DelDOT and KCI modified the overall BMP Rating System **(Table 3)** by directly linking the overall rating to individual BMP parameter scores, which are based on performance and maintenance requirements. The 2009 Annual Report will summarize the inspections for each BMP and provide recommended actions for BMPs in four categories:

- BMPs requiring **MAINTENANCE** by DelDOT maintenance staff (Maintenance Work Orders),
- BMPs requiring **INVASIVE SPECIES** to be eradicated by third party contractor,
- BMPs requiring **CONTRACTED WORK** by a third party contractor, and
- BMPs requiring **RETROFIT** evaluations by DelDOT's Stormwater Program staff.

TABLE 3
AGREEMENT 1354
OVERALL BMP RATING SYSTEM

Rating	Description
A	**No Performance Issues** BMP with No Issues affecting performance.
B	**Minor Maintenance** BMP with Minor Maintenance required; repaired by DelDOT Maintenance District or third party Invasive Spray Contractor.
C	**Major Maintenance** BMP with Major Maintenance required; repaired by third party Contractor.
D	**Retrofit** BMP with Retrofit requirements; BMP is failing; needs to be redesigned or re-built with input from DelDOT Stormwater Quality Program.

1. 2009 BMP Inventory and Inspection

In 2009, BMP inspections were documented for 327 DelDOT-owned BMPs. In January 2009, DNREC completed a Delegation Review of DelDOT's BMP inspection process. DelDOT and KCI demonstrated the BMP inspection process for DNREC on several BMPs in the Dover area. One issue that DNREC wanted to see in future inspections was the documentation of minor issues that are not considered to be affecting performance, but that could be rectified during the time of other maintenance operations on that BMP. KCI performed inspections in late 2009 using a method of tracking minor issues not affecting performance. It is anticipated that the BMP inspection application will be revised in early 2010 to include minor issues not requiring maintenance by themselves.

2. Future BMP Inspections

In 2010, KCI will be inspecting only those BMPs rated A and B. It is anticipated that BMPs rated C and D would be in the process of being maintened during the year. For BMPs rated C and D that are maintained in 2010, the rating would be revised to an A and therefore, would be inspected in the following year. In essence, this inspection schedule allows DelDOT to respond quickly to BMPs as their performance begins to become compromised.

BMP Maintained in 2009

3. 2009 Annual BMP Inventory and Inspection Report

In early 2010, KCI will submit a *2009 Annual BMP Inventory & Inspection Report* that details the 2009 BMP inspections, including Maintenance Work Orders, Invasive Species Spray List, Contracted Work, and Retrofit Recommendations. The 2009 BMP Report will be submitted under separate cover from this report.

D. NEW CASTLE COUNTY RE-INSPECTION

KCI began re-inspection of DelDOT's MS4 in New Castle County subdivisions in February 2008, based on KCI's Agreement 1354 Subdivision Re-inspection Schedule **(Table 4)**. The re-inspection schedule is based on a 5- and 10-year re-inspection cycle for subdivisions according to the acceptance date of the subdivisions. The subdivisions planned for re-inspection in 2009 included those subdivisions accepted from 1951-1965. In July 2009, DelDOT requested that KCI dedicate one of the two KCI field crews working on NCCo Re-inspection to Kent County Initial Inventory and Inspection work. KCI expects to complete the 1951-1965 subdivisions in early 2010 and then begin Re-inspection work on the 1966-1980 period. **Table 5** summarizes the Re-inspection work completed in 2009, which included 168 subdivsions and 6,425 structures **(Table 5)**.

TABLE 4
AGREEMENT 1354
SUBDIVISION RE-INSPECTION SCHEDULE

Year	Subdivisions	End Date*	Cycle	Re-inspect?	Date Completed
1	Database Re-design	12/20/2007	--	--	December 2007
2	1935-1950	12/20/2008	5	Yes	December 2008
3	1951-1965	12/20/2009	5	Yes	March 2010**
4	1966-1980	12/20/2010	5	Yes	
5	1981-1995	12/20/2011	10	Yes	
5	1996-2005	12/20/2011	10	No	--

* Based on 12/20/06 Notice to Proceed
** Anticipated

TABLE 5
AGREEMENT 1354
2009 RE-INSPECTION TOTALS

Month (2009)	Number of Subdivisions	Number of Structures
January	12	687
February	19	753
March	15	507
April	18	731
May	16	749
June	21	691
July	11	484
August	3	277
September	19	452
October	15	519
November	12	339
December	7	236
2009 TOTAL	**168**	**6,425**

E. NEW CASTLE COUNTY INITIAL INVENTORY AND INSPECTION

KCI continued initial inventory and inspection work in New Castle County in 2009. This included performing initial inventory and inspection work at subdivisions recently accepted by DelDOT, and in older subdivisions not inventoried and inspected during previous NPDES Agreements. KCI performed initial inventory and inspection at 12 subdivisions for a total of 350 structures **(Table 6)**.

New Castle County Re-Inspection

TABLE 6
AGREEMENT 1354
2009 INITIAL INVENTORY / INSPECTION TOTALS
NEW CASTLE COUNTY

Month (2008)	Number of Subdivisions	Number of Miles of Non-Subdivision Roadways	Number of Structures
June	10	0.0	239
July	1	0.0	70
December	1	0.0	41
2009 TOTAL	**12**	**0.0**	**350**

F. KENT / SUSSEX COUNTIES INITIAL INVENTORY AND INSPECTION

CEI continued initial inventory and inspection work in Kent and Sussex Counties in 2009. KCI added one crew to the work in Kent County starting in July 2009. The KCI/CEI team inventoried and inspected 43 subdivisions and 124 miles of non-subdivision roadways, for a total of 11,166 structures in Kent and Sussex Counties **(Table 7)**.

Kent County Initial Inventory and Inspection

TABLE 7
AGREEMENT 1354
2009 INITIAL INVENTORY / INSPECTION TOTALS
KENT / SUSSEX COUNTIES

Month (2008)	Number of Subdivisions	Number of Miles of Non-Subdivision Roadways	Number of Structures
January	1	10.0	682
February	0	10.1	620
March	2	5.3	468
April	2	7.8	687
May	0	8.8	562
June	13	7.6	1,150
July	2	8.2	957
August	10	16.2	1,613
September	3	25.1	1,963
October	1	18.7	1,273
November	2	1.0	652
December	7	5.5	539
2009 TOTAL	**43**	**124.3**	**11,166**