

Delaware Valley Regional Planning Commission

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The Delaware Valley Regional Planning Commission (DVRPC), the metropolitan planning organization (MPO) for greater Philadelphia, has a well-developed Congestion Management Process (CMP) that is largely integrated into its other planning processes. The CMP itself consists of four main phases that are completed cyclically, along with other ongoing coordination activities. The four phases are (1) planning, (2) analysis, (3) action, and (4) evaluation. The CMP is particularly well integrated with the metropolitan transportation plan (MTP) and Transportation Improvement Program (TIP) processes, and plays a significant role in project selection. DVRPC also uses the CMP as an educational tool for localities in their transportation planning.

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Source: DVRPC.

Background on DVRPC

Serving metropolitan Philadelphia for more than 40 years, DVRPC fosters regional cooperation in a nine-county, two-State area. City, county, and State representatives work together to address key issues, including transportation, land use, environmental protection, and economic development.

DVRPC provides services to member governments and others through planning, data collection, analysis, and mapping services. Aerial photographs, maps, and a variety of publications are available to the public and private sectors.

The nine counties served by DVRPC are Bucks, Chester, Delaware, Montgomery, and Philadelphia in Pennsylvania; and Burlington, Camden, Gloucester, and Mercer in New Jersey.

CMP Process Model

DVRPC follows a four-step core CMP process consisting of planning, analysis, action, and evaluation (see figure 1). The process is cyclical and is updated every 2 or 3 years. The CMP's analysis and action steps are the bulk of staff time and effort, with each step representing about 30 percent of the total CMP effort. The planning and evaluation steps each account for about 5 percent of the effort. The remaining 30 percent consists of other ongoing tasks that are not easily classified within any of the four steps.

Two MPO staff members are chiefly responsible for the CMP, with about one-third of each person's time devoted to it. Two other staff members spend about 10 percent of their time on the CMP, including one who coordinates the CMP with the TIP and MTP, and one who works with geographic information systems (GIS). Ten more staff members are involved with the CMP in a limited capacity (less than 1 percent of their time).

The CMP includes elements at both the planning and project levels, with integration from bottom to top of the transportation planning and project development process. The CMP plays a significant role in justifying project prioritization, which is important given funding constraints. The MTP references the CMP as a source of analysis and a tool for use in screening highway capacity projects. The CMP also serves an educational role for localities, providing them with knowledge for use in transportation planning. Pennsylvania and New Jersey also use the CMP as a resource for developing projects.

The CMP is entering its third cycle. The refinements in this cycle will focus on identifying strategies by subcorridor. The first cycle focused on defining corridors, and the second focused on refining criteria.

Phase 1 – Planning and the Advisory Committee

The first step in DVRPC's CMP consists of preliminary planning and updates of the framework/method/criteria to be used. The CMP Advisory Committee plays a large role in this phase. The committee is made up of representatives from each county in the region, the Pennsylvania and New Jersey departments of transportation (DOTs), Federal Highway

Figure 1: Congestion Management Process



Source: DVRPC, CMP Web site

Administration (FHWA), Federal Transit Administration, DVRPC Regional Citizens Committee, DVRPC Goods Movement Task Force, transportation management agencies, and others. DVRPC staff check that all key stakeholders are invited to participate in the CMP Advisory Committee, and that new participants are educated on the process.

During this phase, agreement is reached on the methodology for the latest cycle of the CMP, building on the previous cycle. Staff work with the CMP Advisory Committee to agree on the methodology, including timing—this limits procedural controversies from arising later in the process. It also helps as a reminder that each step has time limits, and at some point it is necessary to move forward, keeping a list of things to improve in the next cycle. Staff also reach out to partners in areas they seek to strengthen who may want to participate for the whole cycle, such as in transportation operations or planning and the National Environmental Policy Act (NEPA) process. Additional coordination occurs at the staff level between individual departments within DVRPC and with neighboring MPOs.

The MTP guides the CMP. The CMP helps with midterm implementation of the goals of the plan. In the first cycle of the CMP, policy documents were developed and adopted by the DVRPC Board providing more detail on this linkage, and these are re-adopted in each cycle as part of the CMP Report.

Phase 2 – Analysis

The analysis phase is the heart of the CMP process, where the largest share of technical analysis is performed. This phase includes definition/refinement of criteria for evaluating congestion, gathering data, defining congested corridors and subcorridors throughout the region, and identifying strategies to address congestion.

The CMP Advisory Committee is also deeply involved in this phase. For example, it helps refine and then agree on criteria to evaluate congestion on the multimodal regional transportation network. Criteria address objectives that are based on the MTP's goals. The criteria are:

- Major roads
- Roads with current peak-hour congestion
- Roads with high volume to capacity (V/C) ratios in the future peak-period travel model
- Locations where comparison of the current and future travel model simulations suggest high growth in peak-period V/C ratios
- Existing transit service (bus, trolley, or train)
- Roads that carry transit riders similar in numbers to the capacity of a lane of cars, adding ridership from the different bus routes using the road
- Areas where transit might succeed in 2035 based on demographic forecasts using transit score methodology
- Major roads where high crash rates lead to non-recurring congestion on a regular basis
- Emerging bottlenecks based on growth in traffic counts over the last 10 years and existing capacity limitations

- Areas with two or more times the regional average for employment or residential density
- Current or future development areas identified in the MTP

One activity that DVRPC performs at this phase is an examination of the availability of data sources. Which data sources are no longer available? What are new sources of ongoing data? What data are required to answer the questions the MPO is trying to address? CMP staff work closely with data suppliers within DVRPC, such as the traffic counting staff, GIS staff, and others, to determine the answers to such questions.

DVRPC has a traffic monitoring unit with 10 staff whose primary responsibilities are to collect annual average daily traffic (AADT) counts (about 3,000 per year) and intersection turning movement counts (about 200 per year). Travel-time runs are also conducted by this unit on an as-needed basis. The unit recently purchased equipment to enable automated counting of bicycles and pedestrians. DVRPC plans to purchase equipment next year that will enable detection of Bluetooth devices on the road (from multiple locations along a corridor and recognizing the Media Access Control identification of individual Bluetooth devices), allowing continuous collection of travel-time data. While these counts are a valued source of data, there are no counts done specifically for the CMP.

The DVRPC travel demand model is also a source of data used in the CMP. The model is currently being upgraded from the TRANPLAN platform to VISUM, which will allow more detailed analysis and easier integration of model results with microsimulation programs (such as VISSIM). While a useful resource, a regional travel demand model cannot be expected to be accurate at the link level. It is only used in the CMP where real data are not available.

Following data collection, DVRPC uses analysis of the evaluation criteria and input from the CMP Advisory Committee to identify congested corridors and divide them into logical subcorridors. There are usually about 15 congested corridors in each State within DVRPC's region to keep things manageable while capturing major movements of people and goods. The corridors are divided into more than 100 subcorridors. A unique set of

appropriate congestion management strategies is identified for each subcorridor in a multistep process. Subcorridors are areas where similar strategies are likely to be appropriate at the regional planning scale. Sources of congestion on subcorridors are identified by analyzing the particular criteria that make a corridor and subcorridors rate high in the CMP analysis, and using this information to develop an understanding of likely sources. This is supplemented by local knowledge provided by members of the CMP Advisory Committee.

In addition to defining the corridors, DVRPC outlines a less detailed set of corridors that are likely to become congested in the future, or that are not congested but serve as major regional corridors. A set of strategies appropriate almost anywhere is included in the CMP. Their use is recommended to keep these corridors from becoming congested.

An educational document describes a full range of CMP strategies grouped into nine categories: (1) operational improvements, Transportation Systems Management, and Intelligent Transportation Systems (ITS); (2) Transportation Demand Management; (3) policy approaches; (4) smart transportation; (5) public transit improvements; (6) road improvements; (7) new public transit; (8) goods movement; and (9) new roads. These categories include 100 specific strategies, with a short description of each one.

A technical document, *CMP Procedures*, includes guidance for assessing whether proposed projects would add major single-occupant vehicle (SOV) capacity and whether they are consistent with the CMP. Development of the required supplemental projects should start with strategies identified in the relevant CMP subcorridors. Any major SOV capacity-adding project that is not in a CMP corridor must meet a higher burden of proof. The steps for the various reviews are included as checklists. During each CMP cycle, DVRPC reviews and, if necessary, refines the CMP procedures. Staff also communicate with other MPOs and research groups to learn how they deal with specific technical problems.

At the end of the analysis phase, the DVRPC Board approves the CMP. Updates of the CMP are timed to feed analysis into the MTP update.

Phase 3 – Action

In this phase, DVRPC focuses its attention on using the CMP as a tool to inform other planning efforts, particularly at outside agencies and local governments. Emphasis is placed on communicating the CMP to stakeholders at various levels, helping people understand the value it has to them, and citing situations when using it is required. Communication is conducted on paper; on DVRPC's CMP Web pages, including interactive mapping; and in person—DVRPC does not underestimate the importance of speaking with people face to face.

The following are several ways in which the CMP is implemented:

- Prepare analysis and work first with counties, and then the full CMP Advisory Committee, on a short set of about a dozen priority subcorridors in each State. Take action to focus investments in appropriate strategies in those subcorridors.
- Work with other management systems. For example, use the CMP analysis to develop the New Jersey project identification and prioritization (PIP). The PIP provides input on the first stage of development of TIP projects in New Jersey.
- Work with other MPO projects, especially where there has not been time to coordinate during other phases of the CMP. The CMP serves as a consideration in the selection of access management case studies, safety studies, and other tasks within the DVRPC planning process.
- Produce communication pieces to enhance understanding of the CMP in conjunction with other DVRPC efforts, particularly to address specific needs that emerged in other phases.

Phase 4 – Evaluation

While described as an evaluation task, it has been an ongoing struggle for DVRPC to analyze the experienced and anticipated effects of implemented CMP strategies and projects. DVRPC has done linear and multiple regression studies using data that were available in the region. Staff have also collected a limited number of before-and-after studies, and encourages more research in this area. DVRPC is working with the North Jersey Transportation Planning Authority in its efforts to conduct such studies in northern New Jersey. Staff also write articles and present at meetings and conferences to share information they have learned and gather information from others.

One way the MPO conducts ongoing evaluation is through the performance measures used in the MTP. CMP staff participate in development of the Tracking Progress report, which provides information about these measures.

Ongoing Processes

The four-step CMP process is helpful in conceptualizing and structuring the work, but there is much additional ongoing work, some of which meets the demands of other schedules. It is essential to recognize and budget for this work, which includes:

Work With the TIP

DVRPC reviews all TIP projects, including amendments, to determine which add major SOV capacity. Staff work with project sponsors on consistency or to identify appropriate supplemental strategies based on the CMP to create projects that will have the most long-term benefit toward reaching regional goals. DVRPC publishes an annual memorandum, timed to coincide with TIP updates, tracking the status of supplemental projects identified for major SOV capacity projects. This report is adopted by the Regional Transportation Committee.

Work With Other Programs Within the MPO

CMP staff help select the locations for the two annual corridor studies based on the most congested subcorridors. In addition, two newsletters are prepared each year that help introduce corridor or related studies and help educate participants. Corridor studies identify specific projects for implementation, coordinated with other management systems and stakeholder input. CMP information is coordinated with and used to inform several processes, including linking planning and NEPA, ITS and operations planning, transit planning, goods movement studies, and safety planning.

Work Closely With Project Managers at Implementing Agencies

CMP staff conduct annual outreach meetings at the two State DOTs and sometimes at transit agencies. A wide range of staff who could or should use the CMP are invited to these meetings. Staff work with project managers at the DOTs, starting as early as possible, to consider whether a problem can be addressed by means other than building more SOV capacity. If not, MPO and DOT staff work together to identify supplemental congestion management strategies. Staff activities can include attending or holding stakeholder meetings and/or providing analysis. This has been an extremely valuable element of the CMP.

Everyone Is a Partner in Moving People and Goods

DVRPC works from the bottom up (with municipalities, counties, and citizens) as well as the top down (with Federal and State agencies) as part of the CMP. This coordination is achieved through the CMP Advisory Committee, informal communications, newsletters, the Regional Citizens Committee, and other methods. CMP staff also participate in other agencies' projects and study committees. Examples include the New Jersey Department of Transportation Congestion Management Committee and various FHWA studies. CMP staff also review and provide input on environmental impact statements.

Integration With Other Processes

The CMP feeds outward in four primary ways: (1) to the MTP, (2) to the TIP, (3) to the DVRPC Board's approval of the CMP document, and (4) as an analysis tool for outside partners (a "carrot" to encourage their participation in the process). Some of the ways the CMP is integrated with other processes are discussed below.

Metropolitan Transportation Plan

In developing the CMP, DVRPC ties into the MTP goals, which include land use, environmental, economic development, and transportation goals. At the beginning of an MTP update, MPO staff look at indicators that are tied back to goals of the previous plan to see how well the region is tracking toward its goals and which areas need more attention. The CMP provides input data for this review process. DVRPC times the update of the CMP to feed the most current information available into the MTP. The plan feeds high-level principles to the CMP, and the CMP feeds data and strategies to the plan. The MTP is the primary driver of the CMP development schedule.

The MTP focuses on the CMP as a tool for use in project selection. The plan typically only provides detailed project-level information on major regional projects (large capital projects, typically new roadway capacity and new fixed guideway transit facilities). Other types of projects are covered in 14 broad funding categories, each of which is apportioned a share of overall funding. The MTP is a broad vision document—the region is too large for the plan to get into the details of every specific project.

The evaluation criteria for prioritizing and selecting major regional projects for inclusion in the MTP are two-tiered. The first tier checks that a project is consistent with regional land use plans and the CMP (SOV capacity or new transit facilities must be noted as an appropriate strategy in the CMP). If a project passes this first cut, it is then evaluated according to several criteria, such as whether it serves an identified activity center, whether it is a high-priority CMP corridor, and an environmental analysis.

Transportation Improvement Program

The primary role of the CMP with regard to the TIP is as a screening tool for identifying appropriate projects, including multimodal projects. DVRPC does not have a formal process for developing ideas for TIP projects (such as a pipeline list); however, one is in development. Part of DVRPC's role is to perform corridor studies that can serve as a valuable source of ideas for TIP projects. Project ideas are also identified by external planning partners. Because of funding limitations, relatively few new TIP projects have been added in recent years.

When the TIP is updated or amended, CMP staff check the TIP project list and flag any projects that do not appear to be consistent with the CMP. DVRPC policy states that it will not provide funding beyond the preliminary engineering phase for any project that is not consistent with the MTP and CMP. All projects are checked every time there is a TIP update, as there could be changes in project scope. Staff also check with project managers to ensure that project descriptions provided in the TIP accurately reflect the on-the-ground plans. On projects that are flagged for inconsistency with the CMP, DVRPC works with project managers to address the issues or through the agreed-upon checklists in the CMP Procedures to make the projects consistent.

The annual Status of Supplemental Projects memorandum documents agreed-upon supplemental projects for major SOV capacity-adding projects, recognizing there can be minor changes due to schedule slippage and scope changes. There has been some concern about the added cost of including supplemental projects, but DVRPC works with project managers to identify relatively low-cost strategies and partners. DVRPC depends on the project managers at implementing agencies to provide status updates. Trust is a key element.

DVRPC provides a checklist to project managers at partner agencies highlighting the items they must consider at each stage in their analysis for the CMP. The Pennsylvania Department of Transportation (PennDOT) typically provides project management for all major projects. In New Jersey, project managers could be at the State, county, or local level.

Building relationships with external project managers has been helpful, especially for implementing the supplemental projects. This process began as an after-the-fact checking process (to see whether implemented SOV projects also completed their supplemental commitments), but has since become a more proactive process with extensive coordination.

New Jersey develops an updated TIP annually, and Pennsylvania develops one every other year. In addition, TIP amendments are made almost every month. States and counties come to TIP discussions with their own perspectives and priorities, but the CMP serves as a guidance document for this discussion. In New Jersey, the CMP and other plans are used to help counties identify TIP priorities. In Pennsylvania, the connection between project ideas and the CMP is less direct, but projects do often flow from corridor studies, which in turn flow from the CMP. There is considerable overlap in membership on the CMP and TIP committees, making coordination easier. The TIP document (paper and online) contains notations of CMP status and supplemental strategies for each TIP project. These are also tracked in more depth in an internal database maintained by DVRPC.

Project Planning and NEPA Documentation

PennDOT is implementing a program to link planning and the NEPA process statewide, but does not have a large in-house planning capacity. For this reason, PennDOT would like to use the MPOs and rural planning organizations (RPOs) in the State for their planning capacity. The agency has been trying since 2003 to develop a standard statewide process, but has had difficulty because of the different procedures, experience, and resources at the various MPOs and RPOs. In 2008, PennDOT unveiled a new project development process intended to link planning and NEPA, but encountered difficulty in its implementation. In 2009, PennDOT began work on a new version of the process and the new version was incorporated into the PennDOT Design Manual, released in September 2010. The new process is partially intended to reduce the role of politics in transportation decisionmaking and focus more on collaboration with local governments and citizens.

The CMP relates to efforts to link planning and NEPA because it is the type of broad-based, deliberative planning process leading to specific recommendations at the project level that PennDOT is interested in promoting. The CMP is a tool for communities to identify projects other than capacity projects that could be implemented and have a positive effect on regional goals (including traffic congestion). The statewide effort includes development of NEPA purpose and need during the pre-TIP phase. The CMP can help. PennDOT is developing checklists for project developers that include items related to CMP coordination.

A major goal of this initiative is to ensure that planning documentation is developed in a way that it can be incorporated into the NEPA process. DVRPC already tries to do this (although the “rules” for this are still undetermined). For the CMP this means that strategies and projects should address environmental concerns (such as stormwater disposal) as part of their analysis, and carefully document all analyses.

Other Plans and Processes

- The categories used in the CMP overlap to some extent with those in the Air Quality Conformity process (for example, SOV capacity-adding projects in the CMP are likely to be nonexempt for conformity analysis), allowing for easier coordination between these activities. Also, coordination helps ensure that appropriate CMP strategies are applied on all projects analyzed for conformity.
- The CMP aids in implementation of the regional operations plan and its corridor recommendations (which generally coincide with CMP corridors). The CMP uses DVRPC’s ITS reports, Operations Master Plan, and operations data. Ideally the CMP would also be an input in development of operations and ITS plans, but currently integration mostly occurs in one direction. Also, DVRPC is only responsible for operations planning—implementation of projects is in the hands of local and State agencies.
- On traffic signal optimization projects, the CMP encourages before-and-after studies and DVRPC offers resources to help get them done. Information from the completed studies feed back into the CMP.

Reporting and Visualization

Reporting of CMP Data and Analysis Results

DVRPC uses three levels of reports for its CMP: brief brochures/newsletters for public or elected officials (casual interest); an overview document that provides a brief description of the CMP process and results for staff at various agencies and people with more interest; and detailed technical reports for use within DVRPC and for project managers at implementing agencies. There is also a substantial CMP section on the DVRPC Web site, including static and interactive mapping as well as posting of all documents.

Visualization Practices

While not specific to the CMP, the MTP has used scenario analysis extensively. This involved developing “what if?” scenarios for future development, including a trend analysis, centralized development alternative, and decentralized development alternative. Extensive maps and tables were developed to educate the public on the impacts that different land use decisions would have on transportation needs in the region. Within the CMP documents, tables, charts, and static maps are typically used as visual elements. Figure 2 shows an example of a graphic developed for an informational newsletter on a specific CMP corridor.

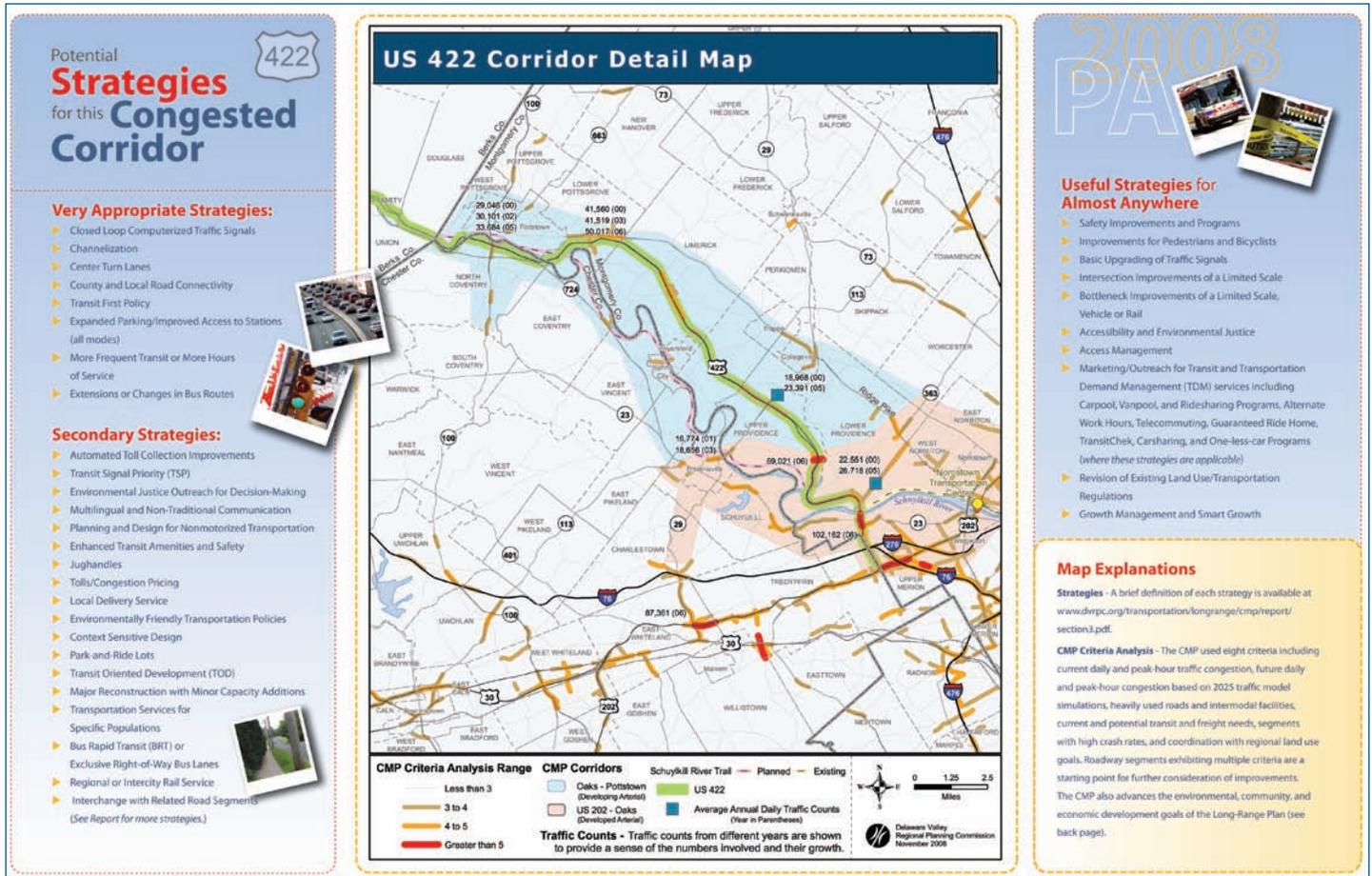
Lessons Learned and Challenges

The DVRPC CMP’s strongest suits include pulling together raw data into a useful form, developing strategies, strong emphasis on planning and ties to the MTP, the educational element for localities and involvement of localities in the process, consistency with county planning, the broad scope of the CMP (including transportation, land use, economic development, and environmental concerns), and broad range of documentation targeted to different audiences. The primary benefit of the CMP is for project development, where it serves as an important tool, especially on large projects.

The depth of available staff at DVRPC is helpful, but the agency generally tries to limit the number of people working on the CMP on a regular basis because of the steep learning curve involved. Having two people primarily work on the CMP, with limited involvement from others for coordination purposes, works well. The CMP should be kept visible in the overall DVRPC planning process, such as through regular presentations to the Regional Transportation Committee and Regional Citizens Committee.

One challenge at the State level is how to turn the example set by large MPOs such as DVRPC into a practice that can be applied at smaller MPOs, which often have limited staff and resources. This has been a source of difficulty in PennDOT’s efforts to standardize the planning and NEPA process across the State.

Figure 2: Graphic From US 422 Corridor Newsletter



Source: DVRPC, CMP Newsletter, Vol. 1 PA, July 2008.