1. Guaranteed Maximum Price

What is it?

The Guaranteed Maximum Price (GMP) is a contract provision where a sum of money is agreed upon between the contractor and the STA for a project. This amount is a not-to-exceed total cost of the services provided during the construction phase of work including the direct costs, overhead, contingency, and fees *(1, 2)*. In the highway construction industry this payment provision is commonly used in combination with the Construction Manager / General Contractor (CM/GC) delivery method.

Why use it?

The GMP payment provision positively affects four project components: project cost, schedule, quality, and the relationship between the STA and the contractor. With respect to project cost, GMP provisions allow sharing the risks of cost overrun with the contractor *(3)* thus reducing the STA’s exposure to substantial cost increases *(3, 4)*, and risks related to price changes in volatile materials *(5)*. In some cases, the STA may decide to provide incentives to the contractor for savings or penalties if it exceeds the GMP. This motivates the contractor to be efficient and to try to achieve cost savings *(6)*. With respect to the project schedule the GMP allows overlapping of the design and construction phases which reduces overall project duration *(3)*. In terms of quality, GMP provisions allow bringing in the contractor earlier in the design stage to advise on construction costs, design aspects, project programming, materials, alternative construction techniques, and constructability issues *(3)*. Finally, in terms of the working relationship GMP helps aligning STA and contractor goals and objectives, producing a better relationship between the parties *(3)*.

What does it do?

Under GMP provisions, the contractor is entitled to receive the maximum price amount only if the actual project cost, including direct costs, indirect costs, contingency, and fees, is equal to or greater than the negotiated amount. If, however, the actual cost is less than the maximum amount, the contractor receives only the actual cost, and, in some cases, an agreed upon share of any savings *(7)*. It is important to note that the term "guarantee" does not mean that the contractor will never exceed the maximum set. Rather, this term implies that the GMP amount is based on the conditions and assumptions at the time the GMP was contractually set *(2)*. Given that in most cases the GMP is negotiated before the design is finished, the contractor is usually allowed to increase compensation beyond the GMP amount if the scope of work or the quantities change substantially compared to what was assumed when the GMP was negotiated.

How to use it?

The first step when using a GMP provision is to determine the timing of the negotiation of the maximum price amount. As said before, the GMP is usually negotiated before the design of the project is completed. As a result the GMP is highly dependent on the level of completion of design at the time of negotiation. The California Department of Transportation *Alternative Procurement* Guide *(1)* provides the following guidelines to determine an adequate timing for negotiation.

* Project goals - The goals of the project are a good starting point in this regard. In projects with scheduling constraints it is more convenient to negotiate the GMP much before 100% design is completed as the contractor can begin the construction phase before design is completed. If the project goals include budget constraints, then it is more convenient to negotiate the GMP when design in closer to 100%, as this timing will provide more certainty in the project quantities and scope of work thus reducing the contingency amounts.
* Scope of project - Here, if the scope of project is complex and requires design near completion in order to avoid any risks and allow lower contingency amounts, the negotiations should take please near design completion.
* Relationship between STA and contractor manager (CM) - If the STA has a productive relationship with the CM, then it may choose to start construction before 100% design is completed. The STA has two options here. First, the GMP can be negotiated before 100% design is reached. Or, second, the STA may choose to pay the work performed on cost plus fee basis and then negotiate a GMP for the remaining work at a later date.
* Risk of Award Timing - The risks decrease as the project gets near to the end of the design phase. In this case, if the probability of risks significantly outweigh the need of early project completion, then the GMP negotiations should take place closer to design completion.

After deciding an adequate timing for GMP negotiations, the following steps consist on calculating the actual GMP. As described before, a GMP has four main components:

* Project direct costs - These consist of the actual costs for the contractor to perform the actual work including labor, personnel, equipment, materials, and subcontracted work. Project direct costs are influenced by four main issues *(2)*:
  + GMP negotiation timing - The earlier the GMP negotiations occur the more uncertainties there will be when calculating the project direct costs.
  + Subcontracting costs - This is affected by the limitations on the amount of work the CM is allowed to self-perform, and the constraints it has on its capacity to select subcontractors. Research has found for instance, that requiring competitive bidding in CMR projects does not necessarily equal to lowest possible GMP.
  + CM self-performance costs - In cases where the CM is not allowed to do any part of the work, it can still incur in some direct costs. As it is not uncommon for a CM to provide subcontractors with some materials or equipment necessary to complete the work, or to decide to perform punch list items. In cases where the CM will perform work packages, the direct costs become those related to materials, equipment, personnel, and labor.
  + Early Material Package Purchases - This deals with requiring the CMR to purchase materials early in the design phase to fix the prices of otherwise volatile materials which can heavily impact the GMP.
* Indirect costs - This consists of the contractor's overhead costs required to manage the project such as project management, supervision, quality control, and administration. It is usually divided between field overhead and home office overhead. This may also include bonding costs *(2)*.
* Profit/ Fixed Fee - This consists of the fee the contractor will be allowed to add to the costs. It can be either a lump sum or a percentage of the total project costs. In case the STA decides to use a fixed project percentage fee, it should establish a fixed fee percentage early on the life of the project as this simplifies and facilitates the GMP negotiation later *(4)*. This part of the GMP does not include the fee paid for preconstruction services.
* Contingency - As indicated above, the contingency depends on the timing of negotiations for the GMP. The earlier the negotiations take place, the higher the contingency required will be. Some important considerations to take into account when calculating the contingency amount of the GMP are to request an open book estimating process to the CM in order to fully understand the risks of the project, and to find an agreement between STA and CM on the allocation of risks.

In addition to this considerations, another contractual element that can be used is the shared savings clause. Many STAs apply this clause to provide an incentive to the CM to increase construction efficiency and provide overall costs savings. However, research *(2)* has found that this practice is counterproductive as the CM is being paid for identifying cost savings during the pre-construction phase, and this can cause a conflict of interests as the contractor may see an opportunity to gain more profit during the construction phase by "holding on" during the pre-construction stage. Finally, one precautionary contract consideration is to have a clause that permits the STA ending the contractual relationship with the GC/CM in case GMP negotiations fail.

An interesting GMP practice is the development of progressive GMP. Since GMP contingency varies with project design completion, this method divides the project into workable phases and work packages to minimize contingency costs and calculates a GMP for each individual part. The final GMP then becomes the sum of all partial GMPs.

When to use it?

The California Department of Transportation *(1)* suggests to use GMP provisions under the following three project circumstances:

* Projects where the STA has reduced management resources as more risks are transferred to the Construction Manager
* Projects with limited time or funding
* Fast-track projects

Limitations?

The following are some of the disadvantages of GMP provisions:

* Since GMP is negotiated there is the risk that GMP sum is overestimated in order to minimize and reduce contractor risks or increase the probability of a higher profit *(8)*
* There are high probabilities that the contractor and STA will disagree on the items or work that is actually included in the GMP when it is negotiated early *(8)*
* Changes in the scope of the project may affect the total costs and increase it above the GMP. The GMP provisions needs to clearly establish the terms for changes as they may cause conflict *(8)*

### Who uses it?

According to the NCHRP report 402 *(2)* California, Oregon, Utah, Arizona, Florida, and Alaska use GMP provisions with the CM/GC project delivery method. Out of these, Arizona, Florida, and Utah have the most experience.

### Example

The Oregon Department of Transportation (ODOT) used a CMR project delivery method with a lump sum GMP contract for the I-5 Willamette River Bridge project. It consisted on removal of the existing Willamette River Bridge and construction of a new 1,800 foot long bridge instead; replacement of the decommissioned Canoe Canal bridge; reconstruction of approximately 2,500 feet of roadway approaching and between the two bridges; and modification to the Franklin Boulevard northbound exit ramp and southbound access ramp.

The project had a cost of $150 million. The final GMP was established before 100% design completion and the CM was allowed to keep any remaining contingency as a shared savings incentive *(2)*. The following articles show the contract provisions related to the GMP and were extracted from the contract documents used by ODOT on this project *(8)*.

**ARTICLE 6**

**FEES, CONTRACT AMOUNT, AND GMP**

6.1 Fees, Pre-construction Costs, Contract Amount, GMP – …If a GMP Amendment is executed, the Agency shall pay the CM/GC, as payment for the Work, the Contract Amount which shall equal the sum of the Pre-construction Costs, the CM/GC Fee, the cost of any bonds and insurance applicable to the Work, and the Cost of the Work (lump sum) including any Early Work, but not exceeding the GMP.

The GMP shall be determined in accordance with the formula set forth below and as described in Article 6.3. Costs in excess of the GMP shall be paid by the CM/GC without reimbursement by the Agency. Changes to the GMP shall only be authorized by Amendment or Change Order.

**Pre-construction Costs (***Becomes NTE***)**

**+ CM/GC Fee (***% of Cost of the Work – becomes fixed dollar lump sum***)**

**+ Cost of the Work (***Becomes lump sum***)**

**+ Bonds and Insurance (***Actual, reimbursable costs)*

**= GMP**

*\*Formula assumes no Early Work is performed.*

6.2 Pre-construction Costs - The Pre-construction Costs shall be payable to the CM/GC based on fixed hourly rates for the CM/GC PM and additional resource personnel on an actual-hours-worked basis up to a maximum, Not-to-Exceed (NTE) sum all of which are identified in Article 17.0. The hourly rates shall cover constructability review services, cost estimating, development of GMP, and all other Pre-construction Phase Services, as described in the **CM/GC General Provisions,** Section 00141.

The NTE Pre-construction Costs are based on the fixed hourly rates for the Pre-construction Phase Services and reported as hourly rates for the CM/GC PM and additional resource personnel and identified in Article 17.0.

If the CM/GC's costs for provision of Pre-construction Phase Services exceed the maximum Pre-construction Costs, the CM/GC shall pay such additional cost without further compensation. The CM/GC shall not be entitled to any CM/GC Fee upon the Pre-construction Costs.

The Agency shall pay the Pre-construction Costs on fixed hourly rates, on an actual-hours-worked basis with each application for payment during the Pre-construction Phase. If the total actual Pre-construction Costs are less than the maximum Pre-construction Costs used for initial calculation of the GMP as provided above, the GMP shall be reduced by the difference. Except to the extent the parties may expressly agree to the contrary in the GMP Amendment, no additional Pre-construction Costs or other fee or compensation shall be payable to the CM/GC with respect to Pre-construction Services performed after execution of the GMP Amendment.

6.3 Establishment of CM/GC Fee; Adjustments to CM/GC Fee:

6.3.1 The CM/GC Fee shall be a fixed dollar lump sum to be identified in the Early Work Amendment(s) and the GMP Amendment, and shall be calculated as \_\_\_% of the Cost of the Work at the time of execution of the Early Work Amendment and GMP Amendment. In making such calculation for the GMP, the Cost of the Work shall exclude the Pre-construction Costs, the CM/GC Fee itself, and any other cost or charge which this CM/GC Contract states is not to be included in calculating the CM/GC Fee.

The CM/GC Fee is inclusive of profit, general and administrative (“G&A”) costs and home office overhead, as normally applied to projects completed by the Proposers Firm. The Agency shall pay the CM/GC Fee ratably with each application for payment during the Construction Phase.

In the case of Early Work Amendments, the CM/CG Fee shall be the above percentage multiplied by the Early Work cost (lump sum), until such time as a GMP Amendment is executed, at which time such CM/GC Fee payments shall be credited against the CM/GC Fee fixed therein.

6.3.2 Notwithstanding any provision of Subsection 00140.30 of the **CM/GC General Provisions** to the contrary, and unless the parties agree in writing to the contrary, any Amendment or Change Order that increases either the Early Work Price or the GMP shall adjust the CM/GC Fee then in effect by multiplying the percentage shown in Article 6.3.1 by the change in the lump sum Cost of the Work reflected in such approved Amendment or Change Order. In addition, if the Contract is terminated for any reason prior to full completion of the Work (including, without limitation, termination during or following performance of Early Work), the CM/GC Fee shall be limited to the total CM/GC Fee multiplied by the percentage of Work completed and accepted at the time of termination, subject to Article 7.2.4. The CM/GC Fee shall not be subject to adjustment for any other reason, including, without limitation, schedule extensions or adjustments, Project delays, unanticipated costs, or unforeseen conditions.

6.5 Determination of GMP

6.5.1 The CM/GC shall deliver to the Agency a proposed GMP and GMP Supporting Documents at any of the milestones identified on the Project Delivery Timeline described in Exhibit A to the **CM/GC General Provisions**. If any subcontracts are in effect at the time the GMP is being established, the CM/GC shall use those subcontracts in establishing the GMP.

6.5.2 As the Plans and Specifications may not be developed to completion at the time the GMP proposal is prepared, the CM/GC shall include in the GMP all remaining Pre-construction Phase Services Work and associated costs required for final development of the Plans and Specifications by the A&E that is consistent with the Contract Documents and reasonably inferable therefrom. Such final development does not include such things as changes in Work scope, kinds and quality of Materials or Equipment, all of which, if required, shall be incorporated by Change Order or Amendment with a corresponding GMP adjustment.

6.5.3 The CM/GC shall include with its GMP proposal a written statement of its basis (the "GMP Supporting Documents"), which shall include:

**(a)** A list of the Plans and Specifications, including all Addenda thereto and the conditions of the Contract, which were used in preparation of the GMP proposal.

**(b)** A list of the clarifications and assumptions made by the CM/GC in the preparation of the GMP proposal to supplement the information contained in the Plans and Specifications.

**(c)** The proposed Cost of the Work, including a statement of all costs organized by bid items, estimated quantities, and unit prices, rolled into a total lump sum value.

**(d)** The proposed GMP shall then be established using the formula set forth in Article 6.1, and shall include the Cost of the Work (lump sum), the CM/GC Fee (% of the Cost of the Work, becomes fixed dollar lump sum), and the reimbursable bond and insurance costs.

**(e)** The Interim and Contract Completion Dates upon which the proposed GMP is based, and a schedule of the construction documents issuance dates upon which the Interim Completion Date(s) are based.

6.5.4 The CM/GC shall meet with the Agency and A&E to review the GMP proposal and the written statement of its basis. If the Agency or A&E discovers any inconsistencies or inaccuracies in the information presented, they shall promptly notify the CM/GC, who shall make appropriate adjustments to the GMP proposal, its basis or both.

6.5.5 Prior to the Agency’s acceptance of the CM/GC's GMP proposal and issuance of a Notice to Proceed, the CM/GC shall not incur any cost to be reimbursed as part of the Cost of the Work, except as specifically provided in an Early Work Amendment.

6.5.6 The Agency shall authorize and cause the A&E to revise the Plans and Specifications to the extent necessary to reflect the agreed-upon assumptions and clarifications contained in the GMP Amendment. Such revised Plans and Specifications shall be furnished to the CM/GC in accordance with schedules agreed to by the Agency, A&E and CM/GC. The CM/GC shall promptly notify the A&E and Agency if such revised Plans and Specifications are inconsistent with the agreed-upon assumptions and clarifications.

6.5.7 The GMP shall include in the Cost of the Work only those taxes which are enacted at the time the GMP is established.

6.5.8 The CM/GC shall work with the A&E and Agency to identify and confirm any Work not specifically shown but required for a complete, fully functional Project. The Agency will direct the A&E to complete the final construction documents in accordance with the Project scope agreed upon by all parties at the time the GMP is established.

6.6 Failure to Furnish an Acceptable GMP - If the CM/GC does not furnish a GMP acceptable to the Agency, or if the Agency determines at any time in its sole discretion that the parties may fail to reach a timely agreement on a GMP acceptable to the Agency, the Agency may terminate the Contract without liability, and the CM/GC shall not receive additional compensation beyond the Pre-construction Costs under the Contract, payable to the date of termination, together with amounts payable for Work completed and accepted by the Agency under an Early Work Amendment, if an Early Work Amendment has been executed, plus any applicable costs of bonds and insurance. Termination under this provision shall proceed under Subsection 00180.90(c) of the CM/GC General Provisions as a termination for the Agency’s convenience. The CM/GC further agrees that the Agency shall not be liable for any damages whether actual, consequential or otherwise for termination of the Contract under this provision. The Agency may elect to complete the construction Work for this Project utilizing any alternative procurement method available.

6.7 Acceptance of GMP - Upon acceptance of the GMP by the Agency, the parties shall execute a GMP Amendment.

6.8 Agency Savings - If the Contract Amount, as defined in Article 6.1, is less than the GMP,the savings shall accrue to the Agency.

**ARTICLE 7**

**CHANGES IN THE WORK**

7.1 Price Adjustments - Adjustments to the Cost of the Work required by changes in the Work shall be determined according to Section 00140 of the CM/GC General Provisions.

7.2 Adjustments to the GMP - Adjustments to the GMP after execution of the GMP Amendment may be made only (a) in the event of changes to the scope of Work, or (b) as otherwise expressly provided in this CM/GC Contract, and then only in accordance with the following procedure:

7.2.1 The CM/GC shall review subsequent iterations of the Plans and Specifications as they are prepared to determine whether, in the opinion of the CM/GC, they result in a change in the scope of the Work so that it can be determined if an adjustment to the GMP is warranted.

7.2.2 Changes to the GMP shall be initiated by written notice by one party to the other ("GMP Change Request"). The CM/GC shall deliver any such GMP Change Request to the A&E and the Agency promptly after becoming aware of any scope or assumption change if, in the CM/GC's opinion, it constitutes grounds for adjustment of the GMP. Any GMP Change Request shall include a proposal as to the appropriate GMP adjustment with respect to the scope change at issue.

7.2.3 The CM/GC shall submit its GMP Change Requests as soon as possible, and the CM/GC shall not be entitled to claim a GMP increase unless the CM/GC submitted a GMP Change Request to the Agency and A&E within the earlier of (a) 30 Calendar Days after the CM/GC has received the information constituting the basis for the claim, or (b) as to Work components which are part of an Early Work Package not yet awarded, prior to submission of subcontracts for such Work and as to Work already subcontracted, prior to commencement of the portion of the Work for which the CM/GC intends to claim a scope change; and (c) in any event, prior to the CM/GC's signing of a Change Order for the scope change.

7.2.4 The Agency may, at any time, submit a GMP Change Request requesting a reduction of the GMP, which shall include the Agency’s basis for such request. For any individual Agency submitted GMP Change Request, or the aggregate of all Agency submitted GMP Change Requests, which result in a reduction of the GMP by 10% or more, will result in the CM/GC Fee being reduced correspondingly.

7.2.5 The CM/GC shall work with the A&E to reconcile all differences in its GMP Change Request within seven (7) Calendar Days from the date of submission of the GMP Change Request. "Reconciled" means that the CM/GC and A&E have verified that their assumptions about the various categories are the same, and that they have identified the reason for differences in the GMP Change Request and the A&Es position. The CM/GC shall submit the Reconciled GMP Change Request to the Agency, which submission shall be a condition to any CM/GC claim for a GMP increase.

7.2.6 If the Reconciled GMP Change Request is not acceptable to the Agency, the CM/GC agrees to work with the Agency and the A&E to provide a GMP Change Request that is acceptable to the Agency.

7.2.7 The CM/GC agrees to make all Project Records, including but not limited to calculations, drawings and similar items relating to the GMP Change Request, available to the Agency and to allow both the A&E and Agency access and opportunity to view such documents at the CM/GC's offices. Upon the Agency’s reasonable notice, the CM/GC shall deliver two (2) copies of such documents to both the Agency and the A&E at any regular meeting or at the Project Site.

7.2.8 GMP increases, if any, shall not exceed the increased Cost of the Work arising from the scope change reconciled in accordance with the above provisions, as arising from the incident justifying the GMP increase, plus the CM/GC Fee applicable to such increase in the Cost of the Work, adjusted in the same manner as described in Article 6.4.4. GMP reductions which are submitted by the CM/GC and accepted by the Agency shall not affect the previously fixed CM/GC Fee.

7.2.9 Except as provided in this Article 7.2, adjustments to the GMP shall be reconciled in accordance with Section 00140 of the CM/GC General Provisions.

7.3 Execution by the Agency - Notwithstanding any provision in the Contract to the contrary, the A&E has no authority to execute Change Orders or Amendments on behalf of the Agency, and only duly authorized personnel of the Agency may do so.

### References

1. California Department of Transportation (Caltrans). *Alternative Procurement Guide.* Trauner Consulting Services, Inc., San Diego, 2008.
2. Gransberg, Douglas D. and Jennifer S. Shane. *NCHRP Synthesis 402:* *Construction Manager-at-Risk Project Delivery for Highway Projects*. National Cooperative Highway Research Program, Transportation Research Board, Washington, DC, 2010.
3. Chan, D., A. Chan, T. Lam, W. Lam, and J. Wong. *An investigation of guaranteed maximum price (GMP) and target cost contracting (TCC) procurement strategies in Hong Kong construction industry*. Hong Kong Polytechnic University, Department of Building and Real Estate, 2007.
4. Minnesota Department of Transportation. *Guaranteed Maximum Price*. White Paper, <http://www.dot.state.mn.us/const/tools/docs/CMGC_WhitePaperTopic2.pdf> [Accessed Nov. 15, 2013].
5. Shane, J., K. Molenaar, S. Anderson, and C. Schexnayder. Construction Project Cost Escalation Factors. *Journal of Management in Engineering*, American Society of Civil Engineers, Vol. 25, No. 4, 2009, pp. 221–229.
6. Boukendour, S., and R. Bah. The guaranteed maximum price contract as call option. *Construction Management and Economics*, Vol. 19, No. 6, 2001, pp. 563–567.
7. Cantirino, J., and S. S. Fodor. Construction delivery systems in the United States. *Journal of Corporate Real Estate*, American Society of Civil Engineers, Vol. 1, No. 2, Apr. 1999, pp. 169–177.
8. Oregon Department of Transportation (ODOT). *Willamette River Bridge*. <http://www.oregon.gov/ODOT/HWY/OPL/pages/Willamette-River-Bridge.aspx#CM_GC_Procurement_Documents> [Accessed Nov. 18, 2013].